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ABSTRACT

A study of the relationships of pitch discrimination, sound discrimination, pronunciation of German phonemes, and cognitive style as factors in language learning ability had as subjects two intact eighth grade German classes with a total of 45 students. Four instruments were used to measure the four variables studied. The findings for 11 research questions suggest that students with fine musical pitch acuity should also possess a strong ability to discriminate linguistic sounds, students who depend on the written word should have a strong ability to discriminate linguistic sounds and to pronounce German phonemes correctly, and students who play musical instruments should have a strong ability to discriminate linguistic sounds. It is recommended that: (1) students who score above average on music aptitude tests should be encouraged to study foreign languages; (2) elementary and junior high school language teachers should provide activities for students to develop a visual orientation; (3) teachers should become more aware of their students' various learning styles; (4) school guidance counselors should encourage students who play musical instruments to enroll in a second language class; and (5) further research using a larger sample from a variety of school situations should be undertaken. (MSE)

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RELATIONSHIPS AMONG EIGHTH-GRADE GERMAN STUDENTS' LEARNING STYLES, PITCH DISCRIMINATION, SOUND DISCRIMINATION, AND PRONUNCIATION OF GERMAN PHONEMES

BY LISA FISH

A PLAN B PAPER SUBMITTED TO THE
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CHAPTER I

PURPOSE OF THE STUDY AND STATEMENT OF THE PROBLEM

I. PURPOSE OF THE STUDY AND STATEMENT OF THE PROBLEM

A. INTRODUCTION

The idea that people have a flair or talent for a particular subject has been accepted for quite some time. It is believed that some people have a talent or an aptitude for languages. Language learning, however, is also dependent upon other individual student factors. Intelligence, attitude, motivation, and cognitive style all play major roles in student learning. An individual's cognitive, or learning, style (whether one is visually, aurally, or kinesthetically - oriented) may indicate how one learns most effectively. Educators are becoming increasingly aware of the importance of teaching-learning style compatibility.

Pitch discrimination ability is another variable which might explain the ways in which a student perceives and produces sounds in a second language. Research has shown that language and music possess some common characteristics; the attributes of pitch, loudness, timbre, intonation, and rhythm seem to exemplify qualities of both. Although few studies have investigated relationships between musical ability and second language aptitude, relationships between pitch discrimination and both sound discrimination and pronunciation of a second language have been investigated and found to have strong correlations (McCoy, 35; Westphal et al, 59; Arellano and Draper, 1).

B. DEFINITION OF TERMS

The term "learning style" or "cognitive style" refers to the way in which a person learns most effectively, that is, receives, understands, remembers, and is able to use new information (48, p. 161). A common belief is that people are either visually- or aurally-oriented. Reinert

maintains, however, that people use one of four specific learning styles. When hearing spoken words he believes that people may: (1) mentally visualize an object or activity, (2) see the word spelled out in their mind's eye, (3) readt only to the sound of a word, or (4) react kinesthetically. Since Reinert's learning style exercise will be used in this study, his descriptions of the four learning styles as well as his definition of learning style will be used.

A second term, "pitch discrimination," refers to the ability to differentiate one musical pitch from another. Few musicians concern themselves with variances in pitch between isolated notes. More realistically, a melody and the pitches from which it is built may be analyzed as a whole. In this study, "pitch discrimination" will refer to the student's ability to identify a melodic or nonmelodic variation of a given selection. (The test used in this study measures not only pitch discrimination but also musical sensitivity to melodic contour.)

The ability to distinguish pitch differences when comparing two melodies reflects both aural discrimination ability and musical understanding, both of which may characterize musical aptitude. Many music educators believe "musical aptitude" is a product of environmental influences and inherited potential. Gordon has listed the most basic factors of musical aptitude to be musical expression, aural perception, and kinesthetic musical feeling. (20, p. 1). His Musical Aptitude Profile (20) measures all three factors; however, in this study, aural perception will be the sole factor of musical aptitude which is examined, and only that section of his test will be used.

Related to pitch discrimination in music is aural or auditory or "sound discrimination" in language, which refers to the ability to differentiate one linguistic sound, either vowel or consonant, from

another. Pimsleur describes "sound discrimination" as the ability to learn new phonetic distinctions and to recognize them in different contexts (43, p. 3). For this study, since the Pimsleur Language Aptitude Battery will be used, so will Pimsleur's definition of "sound discrimination."

The Pimsleur Language Aptitude Battery (42) is made up of seven subtests, one of which measures sound discrimination. Pimsleur defines "language aptitude" in terms of three factors: (1) verbal intelligence, (2) motivation, and (3) auditory ability (43, p. 14). In this study, auditory ability will be the only factor of language aptitude which is measured.

Another term used interchangeably with sound is "phoneme." A "phoneme" is defined as "any of a small set of basic units of sound, different for each language, by which utterances are represented" (46, p. 998). Phonemes, to be classified as sounds, must be pronounced. "Pronunciation" is defined as the act of enunciating or articulating words, phrases, sounds, etc. (46, p. 1060). The learning of a spoken language involves both auditory (or sound) discrimination and pronunciation ability. In this study, pronunciation will refer to mimicry, or imitation of German words. Also, in this study, "articulation" will refer to the act or process of pronouncing speech sounds.

C. STATEMENT OF THE PROBLEM

In this study, the relationships among learning styles, pitch discrimination, sound discrimination, and pronunciation of German phonemes will be investigated. More specifically, the study will examine the following relctionships: pitch discrimination and sound discrimination; pitch discrimination and pronunciation of German phonemes; cognitive style

and sound discrimination; cognitive style and pronunciation of German phonemes; and sound discrimination and pronunciation of German phonemes. Musical background, general grade point average (GPA), and sex will be considered as other independent (moderator) variables. Table 1 displays how relationships will be examined.

TABLE 1: INDEPENDENT AND DEPENDENT VARIABLES: RELATIONSHIPS TO BE EXAMINED.

DEPENDENT / INDEPENDENT	SOUND DISCRIMINATION	PRONUNCIATION
MUSICAL PITCH ACUITY	X	X
LEARNING STYLE	X	X
GENERAL GPA	X	X
MUSICAL BACKGROUND	X	X
PRONUNCIATION	X	
SEX	X	X

The findings from this study should provide second language educators with valuable information about student factors in second language learning. Specifically, the following research questions will be examined:

1. Is there a relationship between pitch discrimination and the ability to discriminate sounds in a second language?
2. Is there a relationship between pitch discrimination and the ability to pronounce German phonemes correctly?
3. Is there a relationship between cognitive style and the ability to pronounce German phonemes correctly?
4. Is there a relationship between cognitive style and the ability

to discriminate sounds in a second language?

5. Is there a relationship between musical background and the ability to pronounce German phonemes correctly?
6. Is there a relationship between musical background and the ability to discriminate sounds in a second language?
7. Is there a relationship between the ability to discriminate sounds in a second language and the ability to pronounce German phonemes correctly?
8. Is there a relationship between general GPA and the ability to discriminate sounds in a second language?
9. Is there a relationship between general GPA and the ability to pronounce German phonemes correctly?
10. Is there a relationship between sex and the ability to discriminate sounds in a second language?
11. Is there a relationship between sex and the ability to pronounce German phonemes correctly?

D. DESCRIPTION OF THE STUDY

A sample of 45 eighth-grade German students at a junior high school in a southern suburb of Minneapolis will be chosen to participate in the study. The students will be taken from two intact classes: there are 23 students in one and 22 in the other. The data will be collected during the month of April 1984. To investigate the given relationships the following tests will be administered: the Edmonds Learning Style Identification Exercise (47), the Pimsleur Language Aptitude Battery (42) - Sound Discrimination subtest, the Gordon Musical Aptitude Profile (20) - Melodic Variations subtest, and the MLA Cooperative Foreign Language Test (37) - German Form LA - Speaking Test. All subjects will take the

tests during their regularly scheduled German class meeting times. The Gordon MAP, the Pimsleur test, and the ELSIE will be administered to each class separately, whereas the German speaking test will be given to each subject individually in a private room.

Since the sound discrimination test takes 15 minutes and the ELSIE takes 12 minutes to administer, both will be given on the first day. The melodic variations subtest takes 15 minutes to administer and, therefore, will be given on the second testing day. The German speaking test takes six minutes and will be administered individually during German class time throughout the four-week period.

Three of the tests, the MLA, the Pimsleur, and the MAP, are presented on tapes, whereas the ELSIE will be read aloud by the researcher. The students will record their responses on answer sheets for all but the speaking test, for which responses will be recorded on cassette tapes. Students will also be asked to fill out a background questionnaire consisting of questions relating to their musical background and language ability. All tests and questionnaires will be identified only by a three digit number which the student will select, in order to conceal identities.

E. LIMITATIONS OF THE STUDY

There are several limitations to this study. First of all, sample size is small and only one school was used. Second, the Reinert Edmonds Learning Style Identification Exercise is not standardized. Third, only parts of the PLAB, the MLA, and the MAP were used, instead of the complete tests. Finally, strict randomization was not possible because classes were already in groups. Furthermore, 18 students in a so-called "gifted" class had been previously selected and placed in a

separate group not used in this study. As a result, the two classes chosen perhaps did not contain a full range of ability levels. These issues will be discussed further in the Implications of the Study in Chapter Five.

F. OVERVIEW OF THE STUDY

Chapter Two will review the literature on learning styles, pitch discrimination, sound discrimination, and pronunciation, and relationships among these variables in regard to language learning.

Chapter Three will explain the procedures and design of the study. The data analysis will appear in Chapter Four.

Chapter Five will report the findings and conclusions of the study and make suggestions and recommendations for future research directions.

CHAPTER II

REVIEW OF THE RESEARCH LITERATURE

II. REVIEW OF THE RESEARCH LITERATURE

A. INTRODUCTION

To begin investigating the topic of relationships between music and language, a computer-based search of the ERIC System was conducted using the following descriptors: aural discrimination, pitch perception, pitch, melody, musicality, language aptitude, musical aptitude, language rhythm, aural-oral skills, pronunciation, cognitive style, second language learning, intonation, and listening. Further sources were found through hand searches of Dissertation Abstracts International, Language and Language Behaviors Abstracts, and the Psychology of Music Index. The bibliographies of all articles were also checked for further references.

The four areas of research included in this study are: (1) the relationship between pitch discrimination and sound discrimination, (2) the relationship between pitch discrimination and pronunciation of phonemes in a second language, (3) the relationship between cognitive style and second language learning, and (4) the relationship between age and the learning of new sounds in a second language.

B. RELATIONSHIP BETWEEN PITCH DISCRIMINATION AND SOUND DISCRIMINATION

The first relationship requires a "good ear," according to Jones (26). Having a good ear involves ability to discriminate between sounds and the ability to remember and recognize foreign sounds easily (26, p. 2). Dorcus, Mount, and Jones (13) observe that all foreign languages may not be equally dependent upon pitch discrimination for successful acquisition, but other researchers say that the ability to discriminate between different sounds is important in speech and language skill development.

Kuper (27) points out that the ability to discriminate changes in pitch and series of tones, whether ascending or descending, serves as an adjunct to aural discrimination of speech sounds (p. 168). According to Miller (36), research on aphasia and amusia has indicated that "people who have difficulty discriminating pitch, timbre, and melodic patterns also have difficulty with the understanding of words" (p. 49). Madsen et al (32) investigated the use of music stimuli in teaching language discrimination and based their study on the belief that children develop the capacity to discriminate tones and melodies before they develop phonetic discrimination ability. They concluded that music could be used to aid children with discrimination disabilities in decoding tones and other sounds (p. 182).

It appears that people who possess a fine sense of pitch discrimination should also have superior ability in discriminating language sounds. Since musical training enhances tonal consciousness, people who have had musical instruction should have the ability to do well in the learning of aural language. Blickenstaff (6) believes that pitch discrimination ability has a positive effect on the learning of a second language and hypothesizes that the students possessing the least musical talent should profit most from musical training in regard to foreign language achievement (p. 360). In another study, McCoy (35) explains pitch differently. She maintains that "true comprehension of a spoken language requires the ability to discriminate intonation variations . . ." (p. 295). Gilbert (19) believes that second language learners find it difficult to hear the intonation of a language, for they concern themselves more with understanding the strange sounds and meanings of words (p. 22). Yet intonation remains very important, carrying information about content and emotion. She suggests that students be offered a

speech model stripped of everything but melody and rhythm in order to help them pay attention to the "music" of a second language. She advocates the use of kazoos to familiarize students with intonation patterns.

C. RELATIONSHIP BETWEEN PITCH DISCRIMINATION AND PRONUNCIATION OF PHONEMES IN A SECOND LANGUAGE

It is almost a common sense assumption that auditory discrimination and pronunciation ability are related. As reported by Politzer and Weiss (45), if a student has difficulty distinguishing phonemes in a second language, he will probably also have difficulty in pronouncing those sounds correctly (p. 76). Carroll (9) advocates the importance of correct pronunciation for those persons intending to communicate with native speakers of the second language. Westphal et al (59) maintain, however, that students need to hear the sounds of the language, by differentiating variations in "pitch, duration, and other aspects of sound before attempting to reproduce the oral language" (p. 258).

Other discrimination studies suggest that a relationship exists between phonetic discrimination and articulation ability (33, p. 68). In speech programs, Marsh and Fitch (34) advocate the use of music and feel it is an effective tool in teaching phonics and articulation (p. 90). Marsh and Fitch explain that music may aid in developing aural discrimination ability, which is becoming a critical factor in "acquisition and development of communication skills" (p. 89). In another study, Eterno (16) found a direct relationship between musical aptitude and foreign language pronunciation; the percentage of agreement increased as the age of the pupils increased, and the musical aptitude became a more significant factor as instruction in the modern language increased. On the basis of hos study, it is evident that musical aptitude and musical training (1 year or more) are important

factors in foreign language pronunciation success (p. 169).

The Seashore Measure of Musical Talents (53) and the Gordon Musical Aptitude Profile (20) are two musical aptitude tests which measure various aspects of music, such as pitch, rhythm, loudness, timbre, time, tonal imagery, and musical sensitivity. Westphal et al (59) investigated the relationship between psycho-acoustic factors and achievement in second language learning. The Seashore test, standardized intelligence tests, and oral language tests were administered and scores were correlated. Pitch emerged as the only Seashore Measure which correlated positively with all of the ninth-grade criteria of German achievement (p. 262). From the results of the study, they hypothesize that a relationship exists between the ability to hear differences in pitch in both first and second language learning.

D. RELATIONSHIP BETWEEN COGNITIVE STYLE AND LANGUAGE LEARNING

Reinert (47) developed a learning style exercise in order to determine the way in which individual students learn best. ELSIE, (Edmonds Learning Style Identification Exercise), was developed in the Edmonds, Washington, School District in 1969 as a prescriptive measure for the individualized foreign language program. Reinert based ELSIE on two hypotheses: (1) that "each individual is 'programmed' to learn most efficiently in certain ways;" and (2) that "one's pattern of internalization of his native language gives a profile of his learning style" (pp. 160-1). Individuals learn and internalize words in their own unique way, and this exercise was developed to find out more about those learning and internalization patterns.

The exercise consists of fifty English words which are read aloud to the participants. Words represent various parts of speech and are a

combination of both abstract and concrete terms. Since one's native language is first learned in its spoken form, Reinert chose to present the words orally and not in written form. All fifty words are read aloud at ten-second intervals without repetition, since the student's first reaction to the words is most important. Responses to the words seem to fall into four categories: (1) the person has a mental image of an object or activity, (2) the person has a mental image of the written word, (3) the person receives meaning from the sound without any visualization, or (4) the person has an emotional or physical response. The purpose of ELSIE is to provide practical help for the classroom teacher in identifying individual student learning styles.

Hosenfeld (22) points out that teachers need to find out how their students study or learn. Students often perform tasks very differently from the way the teacher assumes them to be done. She proposes a self-observation, self-reporting procedure to provide teachers with knowledge about individual learning strategies. In this procedure, students are asked to think aloud while doing some exercises. The teacher or student assistant acts as interviewer by asking indirect questions about the student's learning processes.

E. RELATIONSHIP BETWEEN AGE AND THE LEARNING OF NEW SOUNDS IN A SECOND LANGUAGE

Optimal age for learning a second language remains a controversial topic. Many educators believe that language training should begin in the elementary school to take advantage of younger learners' discrimination abilities. Kuusinen and Salin (28) point out that younger children have less interference in learning unfamiliar phonological sequences (p. 560). Penfield and Roberts (40) support early language training, suggesting that

foreign language instruction begin between the ages of four and ten.

Birkmaier (4) supports the opinion that the ability to aurally discriminate new sounds becomes more difficult for people past the age of 12 (p. 123). Lenneberg (29) believes that human beings become incapable of acquiring correct pronunciation in a second language after puberty (p. 176). In a study on pitch discrimination and French accent, Dexter (11) found that the correlation between pitch and accent increases as the age of the subjects decreases (p. 720). To test the relationship between age and pronunciation ability in English, Asher and Garcia (3) conducted a study with a group of Cuban immigrants, ages seven to nineteen. The intent of the study was to compare the pronunciation of English sentences by the Cuban children and American children (p. 335). The study concluded that the younger the child, the greater the chances for acquiring excellent pronunciation. Olson and Samuels (39) cite evidence, however, that the age-language acquisition relationships favoring younger students hold for first languages only (p. 267).

A contrary view held by some educators is that age has little effect on language learning. Thogmartin (57) investigated the relationships among age, individual differences in musical and verbal aptitude, and pronunciation achievement by elementary school children learning a foreign language. One experiment tested the hypothesis that younger children would find it easier than older children to acquire new speech sounds under intensive training (p. 66). Analysis of variance showed that the effect of age on the learning of new sounds was not statistically significant; thus younger children's superiority in pronunciation was not confirmed. Wipf (61) made similar conclusions following his investigation of the relationship between the age of elementary students, Kindergarten through sixth grade, and their abilities to imitate selected sounds in German.

He found a significant difference in the scores among all grade levels which showed that imitative ability increased with age.

Although much research conducted on age and second language learning indicates that younger learners, children up to the age of puberty, acquire near-native pronunciation in a second language more easily than older learners, it should not be implied that older learners are incapable of learning how to communicate in a second language. Even though pronunciation of new sounds increases in difficulty as age increases, adults tend to gain syntactic and semantic control more quickly than younger learners.

F. CONCLUSION

The literature presented in this chapter indicates that the ability to discriminate pitch has a positive effect on the learning of aural and oral language, both in perceiving and producing phonemes in a second language. However, the effects that cognitive style have on the learning of aural and oral language need to be investigated further. First of all, it seems that aural learners who possess fine pitch acuity would be able to discriminate sounds in a second language more easily than visual learners, with or without pitch acuity. Second, since sound discrimination and articulation appear highly correlated, it seems that aural learners would also possess the ability to achieve near-native pronunciation in a second language. To examine these points, further investigation is necessary.

The following chapter describes the procedures and design of the study.

CHAPTER III

PROCEDURES AND DESIGN OF THE STUDY

III. PROCEDURES AND DESIGN OF THE STUDY

A. INTRODUCTION

This chapter will discuss the procedures and design of the study, which was conducted in a southern suburb of Minneapolis to investigate the effect of musical pitch discrimination and learning style on the learning of sound discrimination and pronunciation in a second language. This chapter includes: (1) a description of the sample, (2) a discussion of the instruments, (3) a description of procedures used in carrying out the study, and (4) a description of procedures for analyzing the data.

B. NATURE OF THE SAMPLE

Two classes of eighth-grade students of German, at a junior high school in a southern suburb of Minneapolis, were used as subjects. The chosen school district community population is approximately 37,000. The district provides eight elementary schools, two junior high schools, and one senior high school. The majority of the students come from privately-owned homes and live with both parents. The community is highly interested in the education of its children.

The junior high school chosen for this study has an enrollment of 1307. There are 634 females and 673 males. (See Table 2)

TABLE 2: JUNIOR HIGH SCHOOL ENROLLMENT FIGURES.

SEX / GRADE	MALES	FEMALES	TOTAL
7	207	211	418
8	241	210	451
9	225	213	438
TOTAL	673	634	1307

Seven hundred eighty-one students are studying foreign languages: 365 in German, 146 in French, and 270 in Spanish; there is a total of 348 males and 433 females. (See Table 3)

TABLE 3: ENROLLMENT FIGURES BASED ON SEX AND LANGUAGE

	MALES	FEMALES	TOTAL
German	186	179	365
French	47	99	146
Spanish	115	155	270
TOTAL	348	433	781

Foreign languages are offered as elective courses to all interested students, beginning in the seventh grade. Of the 418 seventh grade students, 286 are enrolled in a foreign language. (See Table 4)

TABLE 4: ENROLLMENT OF SEVENTH-GRADE STUDENTS

	MALES	FEMALES	TOTAL
German	68	45	113
French	22	42	64
Spanish	39	70	109
TOTAL in FL	129	157	286
Not in FL	78	54	132
TOTAL	207	211	418

There are nine elective subjects for eighth-graders to choose from: Developmental Reading, Typing, Band, Chorus, German, French, and Spanish. Eighth-graders choose two of the nine courses. Elective courses in eighth grade meet every other day for 46-minute class periods.

One hundred-two of the 451 eighth-grade students are enrolled in German. In order to enroll in eighth-grade German, the student must have completed seventh-grade German. (See Table 5)

TABLE 5: ENROLLMENT OF EIGHTH -GRADE STUDENTS

	MALES	FEMALES	TOTAL
German	48	54	102
French	16	35	51
Spanish	44	34	78
TOTAL in FL	108	123	231
Not in FL	133	87	220
TOTAL	241	210	451

Ninth-grade students can begin a foreign language or continue to study the language they selected in seventh-grade. Two hundred sixty-four of the 438 ninth-grade students are enrolled in a foreign language. (See Table 6)

TABLE 6: ENROLLMENT OF NINTH-GRADE STUDENTS

	MALES	FEMALES	TOTAL
German	70	80	150
French	9	22	31
Spanish	32	51	83
TOTAL in FL	111	153	264
Not in FL	114	60	174
TOTAL	225	213	438

The text used in eighth-grade German is German Today (38). Chapters one through three are covered in the seventh grade and chapters four through seven are taught in the eighth grade. Each chapter is

supplemented by additional materials provided by the teacher. No tapes are used for language learning since there is no language laboratory.

The teacher is a very positive, enthusiastic individual, who helps to create a warm, non-threatening atmosphere in her classroom. She has taught German for approximately ten years and before that studied at a German university for one year.

The two classes participating in the study contained 23 and 22 students. There were 22 males and 23 females involved in the study: 12 males and 11 females in period two and ten males and 12 females in period three. (See Table 7)

TABLE 7: SEX OF THE STUDENTS IN THE STUDY

CLASS PERIOD	MALES	FEMALES	TOTAL
2	12	11	23
3	10	12	22
TOTAL	22	23	45

C. INSTRUMENTATION

Three standardized tests were used in this study: (1) the Pimsleur Language Aptitude Battery (42); (2) the MLA Cooperative Foreign Language Test - German, Form LA (37); and (3) the Gordon Musical Aptitude Profile (20). One non-standardized test was used: (4) Reinert's Edmonds Learning Style Identification Exercise (47). In addition, two instruments were constructed for the study: (5) a student background questionnaire, and (6) an interview schedule.

1. The Pimsleur Language Aptitude Battery (PLAB)

The Pimsleur (PLAB) test is made up of six component parts which measure different aspects considered to indicate aptitude for language learning in a school setting: grade point average, motivation, verbal ability, and auditory ability. The six parts include: Part 1 - Grade Point Average; Part 2 - Interest in Learning a Foreign Language; Part 3 - Vocabulary; Part 4 - Language Analysis; Part 5 - Sound Discrimination; and Part 6 - Sound-Symbol Association. In this study, Part 5 was the only subtest administered. Part 5, the sound discrimination subtest, contains 30 spoken sentences in an East African language, known as Ewe, recorded on tape. After being aurally introduced to three words in Ewe, the students are asked to identify which word/sound they hear in a sentence context. It tests the student's ability to learn new phonemes and to recognize them in different contexts.

The PLAB is designed for use in grades seven through 12 and it is intended to predict a student's success in foreign language learning and to diagnose his language potentialities (43, p. 16). Pimsleur (43) reports the predictive validity of his test using the MLA Cooperative French Tests as a criterion. Multiple correlation coefficients were established: (1) R = .476 with the Reading Test; (2) R = .706 with the Writing Test; (3) R = .338 with the Listening Test; and (4) R = .704 with the Speaking Test (N = 46), (p. 17).

Reliability of the PLAB, made up of split-half reliability coefficients, is reported for parts three through six. Results of one reference group achieved the following reliability:

TABLE 8: SPLIT-HALF RELIABILITY COEFFICIENTS FOR PARTS THREE THROUGH SIX OF THE PLAB (42, p. 18)

REFERENCE GROUP	N	PART 3 VOCAB. 24 ITEMS	PART 4 L.A. 15 ITEMS	PART 5 S. DISC. 30 ITEMS	PART 6 S-S A. 24 ITEMS	PARTS 3-6 93 ITEMS
BEGINNING GRADE 8	979	.74	.76	.78	.74	.89

2. The MLA Cooperative Foreign Language Tests (MLA)

The MLA Cooperative Foreign Language Tests are provided in French, Spanish, German, Russian, and Italian, in four language skills: listening, speaking, reading, and writing. There are two levels and two forms at each level. The LA and LB forms are appropriate for students having studied a foreign language for one to two full years in a secondary school or one to two semesters in college. Forms MA and MB are appropriate for students having studied a foreign language for three to four years in a secondary school or three to four semesters in college.

The speaking test contains three subsections: (1) mimicry of short phrases, (2) reading a paragraph aloud, and (3) describing some pictures. In this study, only the mimicry section of the German, Form LA Speaking Test was used, as this measures the student's ability to pronounce German phonemes following an aural rather than a visual stimulus. Fifteen short German phrases are read aloud on tape. After the student hears each phrase, he repeats and records the phrase, to the best of his ability, into a cassette recorder.

The MLA Cooperative Foreign Language Tests are considered to be achievement tests. The LA and MA forms may act as pre-tests and the LB and MB forms as post-tests. None of the literature or administration materials refer to the validity; nevertheless, one can assume that panels of experts were consulted, as in the case of other MLA tests, since there

were no criterion instruments of known validity at that time. The MLA Cooperative Foreign Language Tests Handbook indicates that estimates of the reliability of the speaking test were computed by an analysis of variance procedure, R = .879 for German LA, but gives no further information.

3. The Gordon Musical Aptitude Profile (MAP)

The Gordon Musical Aptitude Profile (MAP) is divided into three main parts: Tonal Imagery, Rhythm Imagery, and Musical Sensitivity. Separate subtests are provided for each section: Melody and Harmony in Part I; Tempo and Meter in Part II; and Phrasing, Balance, and Style in Part III. It is designed to be used in grades four through twelve. The major purpose of the MAP is to act as an objective aid in the evaluation of students' basic musical aptitude, so that the teacher can better provide for individual needs and abilities (20, p. 2). It is designed to minimize the effects of musical achievement so that the basic factors of musical aptitude may be evaluated (p. 1).

The Tonal Imagery section consists of two subtests: Melody and Harmony. In this study, the melody subtest was the only test which was administered, since it measures pitch discrimination within melodies and this is an aspect considered suitable for the present study. Twenty short melodic selections and twenty "musical answers," performed on a violin, are played on tape. The selections and musical answers contain one or more musical phrases, rather than a series of isolated notes. In each case, the musical answer contains more notes than the original selection. The subject is asked to compare a musical answer to a short selection, deciding whether the musical answer is a melodic variation of the selection and thus like the selection, or whether the musical answer is not a melodic variation of the selection and, therefore, is different

from the selection. Gordon (20, p. 70) reports within-school predictive validity coefficients for the MAP with musical achievement test scores as criteria. (See Table 9)

TABLE 9: WITHIN-SCHOOL PREDICTIVE VALIDITY COEFFICIENTS FOR THE MAP WITH MUSICAL ACHIEVEMENT TEST SCORES AS CRITERIA: MELODY.

APTITUDE TEST	TEST M MELODIC RECOGNITION	TEST R RHYTHMIC RECOGNITION	TEST H HARMONIC RECOGNITION	TEST S SYMBOLIC UNDERSTANDING
T2: MELODY	.33	.24	.38	.33

Reliability of the MAP, computed by split-half procedures, is presented for all tests, all grades, and for musically select groups. The eighth-graders in the standardization sample (N = 1494) obtained the following reliability coefficients: (See Table 10)

TABLE 10: RELIABILITY COEFFICIENTS FOR THE MAP: TONAL IMAGERY (20, p. 50).

GRADE	T1: MELODY	T2: HARMONY	T: TONAL IMAGERY
8	.79	.75	.87

4. The Edmonds Learning Style Identification Exercise (ELSIE)

The Edmonds Learning Style Identification Exercise (ELSIE) was developed by Harry Reinert in Edmonds, Washington, as a prescriptive measure for an individualized foreign language program. The exercise consists of fifty English words, both concrete and abstract, which are read aloud at ten-second intervals without repetition. The students respond to each word individually by circling a letter in one of four columns: picture, spelling, sound, feeling, according to their first

reaction to the word. The purpose of ELSIE is to provide practical help for the classroom teacher in identifying individual student learning styles. A copy of the instructions and word list appear in Appendix C.

No reliability or validity of this exercise are available, but it has been highly recommended by others having used it.

5. Student Background Questionnaire

A student background questionnaire was constructed by the investigator. The questionnaire asked the students to identify their musical background, to personally rate their ability to speak German, to personally rate their ability to learn another language, to fill in their estimated general GPA, and to assign themselves a three-digit number to be used as an identification number for the entire study. Their German teacher filled in their third quarter German grades. The questionnaire is reproduced in Appendix C, and the results appear in the raw data printout in Appendix D.

6. Interview Schedule

To obtain further information about the school district, enrollment figures, and the German language program, the teacher was interviewed. The questions used in the interview are reproduced in Appendix C.

D. PROCEDURES

Before beginning the study, various correspondences were written for permission and consent. First, the Human Subjects Committee at the University of Minnesota was contacted and application was made for approval of the study. An affirmative response was sent. A copy of the response appears in Appendix B. Second, the teacher and principal of the chosen junior high school were contacted for approval to conduct the study. The principal was also given an introductory letter regarding the investigator and the study. Third, an informative letter was sent to the parents of all students involved. A copy of the parents' letter appears in Appendix B. The study was conducted during the month of April, 1984, on five separate days. Since the eighth-grade German classes meet every other day, the investigator had to work around their schedule.

On the first day of the study, April 6, the students in both classes filled out the background questionnaire, and were administered both the ELSIE and the Pimsleur - Sound Discrimination subtest. The students completed the questionnaire in six minutes. After collecting the questionnaires, the ELSIE was explained, using a shortened version of the author's instructions, and administered by the investigator. It took 12 minutes. The students marked their answers on an answer sheet. Following the ELSIE, the students took the Pimsleur test, which was administered on a reel-to-reel tape and lasted 12 minutes. Students were asked to mark their answers to the Pimsleur test on an answer sheet which the investigator had developed. Since only part of the PLAB was used, it was felt that a separate answer sheet should be prepared. No problems were experienced with the tape and the tape recorder. All students were attentive and could hear and understand what was said on the tape. One boy, though, had trouble hearing when the ELSIE was

administered and, therefore, his data were dropped from the study.

On the second day of the study, April 10, the Gordon MAP - Melodic Variations subtest was given and the MLA speaking tests were begun. The MAP was explained and administered to each class on a reel-to-reel tape and lasted 15 minutes. The tape player produced the sounds of the MAP very clearly. In the remaining 20 minutes of each class period, students began taking the MLA speaking test, which was given individually in the language teachers' office. Each speaking test took only five minutes, so that three students could take it period two and four students could take it period three. The speaking test had been rerecorded from a reel-to-reel tape onto a cassette, which was then played on a Sony cassette player. The Sony, however, did not produce extremely clear sound. This could be due to the fact that the test had been rerecorded, thus the quality was not the best. The following instructions were given to each student before beginning the test: "On this test you will hear 15 short German phrases. Following the instructions you will need to identify yourself with your I.D. number. When the test begins, it is important that you repeat the sounds you hear, even if you do not know what they mean." The investigator felt it necessary to add those directions after the first few subjects took the test, since the first few people refused to repeat anything they did not understand.

The students imitated the words/sounds they heard into another cassette recorder. All tests were recorded onto 90 minute TDK - high reliability cassettes with low noise and high output.

On the third, fourth, and fifth days of the study, April 16, 18, and 23, the MLA speaking test was individually administered to six or

seven students from each class per day. The teachers' office was quiet most of the time, but occasionally we could hear the class across the hall, and a couple of times a teacher walked in to pick up something or use the telephone.

E. DESCRIPTION OF PROCEDURES FOR ANALYZING THE DATA

The three standardized tests, the Pimsleur - Sound Discrimination subtest, the MAP - Melodic Variations subtest, and the MLA - speaking test, were hand-corrected using answer keys provided in the test manuals. The speaking tests were listened to one day after they had been given and scores were recorded on individual answer sheets. The ELSIE was also evaluated by hand, but since there are no correct answers, the answers in each column were simply added up and the sums were written at the bottom of each column. See the forms in Appendix C. Student test results were then recorded on a Fortran coding form to be transferred later onto an Apple II Plus diskette. Information from the student background questionnaire was also recorded on the coding form.

After all the data had been collected and scores had been recorded on the Fortran coding form, all data were transferred onto an Apple II Plus diskette. With the aid of a computer consultant, the data were then transferred into the SPSS system. The mean, median, mode, standard deviation, skewness, standard error of the mean, variance, range of scores, and correlation coefficients were computed for all data. The Pearson Product Moment Correlation was performed on all continuous data and the results were analyzed to examine the following null hypotheses:

1. There is no significant relationship between pitch discrimination and the ability to discriminate sounds in a second language.
2. There is no significant relationship between pitch discrimination and the ability to pronounce German phonemes correctly.
3. There is no significant relationship between cognitive style and the ability to pronounce German phonemes correctly.
4. There is no significant relationship between cognitive style and the ability to discriminate sounds in a second language.
5. There is no significant relationship between musical background and the ability to pronounce German phonemes correctly.
6. There is no significant relationship between musical background and the ability to discriminate sounds in a second language.
7. There is no significant relationship between the ability to discriminate sounds in a second language and the ability to pronounce German phonemes correctly.
8. There is no significant relationship between general GPA and the ability to discriminate sounds in a second language.
9. There is no significant relationship between general GPA and the ability to pronounce German phonemes correctly.
10. There is no significant relationship between sex and the ability to discriminate sounds in a second language.
11. There is no significant relationship between sex and the ability to pronounce German phonemes correctly.

Chapter Four will present the analysis of the data.

CHAPTER IV

ANALYSIS OF THE DATA

IV. ANALYSIS OF THE DATA

A. INTRODUCTION

In this chapter, the data will be analyzed and discussed. Each testing instrument along with its measures of central tendency and other statistical analyses will be presented. The results of the data analysis will then be discussed according to each of the null hypotheses. Pearson Product Moment Correlation was the statistical technique used to examine the significance of relationships among the variables. The following variables were entered using SCSS (Conversational SPSS): NOS. In parentheses following each variable is the short code name and number seen in the raw data printout in Appendix D.

Display tables showing individual relationships will also be shown and discussed.

TABLE 11: VARIABLES ENTERED INTO THE COMPUTER

1. Identification number (4. ID)
2. Class period (5. CLASS)
3. Age (6. AGE)
4. Grade level (7. GRADE)
5. Sex (8. SEX)
6. Third quarter German grade (9. GERMAN)
7. General GPA (10. GPA)
8. Self-rated ability to speak German (11. SPEAK)
9. Self-rated ability to learn another language (12. LEARN)
10. Play a musical instrument (13. PLAY)
11. Take music lessons (14. TAKE)
12. Play/sing in a musical organization (15. PLAYSING)
13. Score on the Pimsleur test (16. SOUND)
14. Score on the picture column on the ELSIE (17. PICTURE)
15. Band score on the picture column on the ELSIE (18. BNDPICT)
16. Score on the spelling column on the ELSIE (19. SPELLING)
17. Band score on the spelling column on the ELSIE (20. BNDSPELL)
18. Score on the sound column on the ELSIE (21. SNDCOL)
19. Band score on the sound column on the ELSIE (22. BNDSND)
20. Score on the feeling column on the ELSIE (23. FEELING)
21. Band score on the feeling column on the ELSIE (24. BNDFEEL)
22. Score on the MAP (25. MUSAPT)
23. Score on the German speaking test (26. SPEAKTST)
24. Second rating score on the German speaking test (27. SECRATE)

After identifying the variables, the mean, median, mode, standard deviation, and the range of the scores were computed for the sound discrimination test, the individual learning style columns, the melodic variations subtest, and the German speaking test. Then, an intercorrelation matrix was computed for all variables but grade level. The entire computer printout appears in reduced size in Appendix D.

B. RESULTS OF THE ANALYSIS ACCORDING TO THE NULL HYPOTHESES

1. There is no significant relationship between pitch discrimination and the ability to discriminate sounds in a second language.

The Gordon Musical Aptitude Profile (MAP) - Melodic Variations subtest was given on the second testing day to determine students' abilities to discriminate pitch variations in a melodic context. Out of 40 possible points, the maximum achieved score was 40 and the minimum achieved score was ten, making the range 30 points. The mean of the distribution of scores was 28.02, the median was 28.37, the mode was 30.00, and the standard deviation was 6.15. (See Table 12)

TABLE 12: ANALYSIS OF THE MUSICAL APTITUDE PROFILE

Mean:	28.02	Minimum score:	10
Median:	28.37	Maximum score:	40
Mode:	30.00	Range:	30
Standard Deviation:	6.15	Total possible:	40

The Pimsleur Language Aptitude Battery (PLAB) - Sound Discrimination subtest was administered on the first testing day to determine the students'

abilities to learn and distinguish new phonemes in a second language. Out of 30 possible points, the maximum achieved score was 29 and the minimum achieved score was 11, making the range 18 points. The mean of the distribution of scores was 18.47, the median was 18.25, the mode was 19, and the standard deviation was 4.58. (See Table 13)

TABLE 13: ANALYSIS OF THE PIMSLEUR TEST (PLAB)

Mean:	18.47	Minimum score:	11
Median:	18.25	Maximum score:	29
Mode:	19.00	Range:	18
Standard Deviation:	4.58	Total possible:	30

When MAP scores and Pimsleur test scores were correlated, the Pearson Product Moment Correlation was: $r = .557$, $p \leq .000$**. Using .05 as the level of significance, the null hypothesis of no relationship was rejected. There seems to be a significant relationship between pitch discrimination and the ability to discriminate sounds in a second language.

Because the numbers were small, it was possible to examine individual performance of students in the classes. First, the eight top scorers on the MAP and the eight lowest scorers on the MAP were arrayed and results of these students on the PLAB were examined. See Table 14, which also shows the same students' sex, GPA, musical background, MLA score, and learning style, which will be discussed in this chapter as well.

** refers to highly significant "p" values, less than .01

* refers to significant "p" values, less than .05

TABLE 14: ANALYSIS OF EIGHT TOP AND EIGHT LOWEST SCORERS ON THE MAP IN RELATION TO SIX OTHER VARIABLES

ID #	Sex	GPA	MAP	*MusBack	PLAB	MLA	**LearnStyle
321-2	F	A-	36	3	29	09	spelling
666-2	M	C	36	0	26	11	even
124-2	F	A-	37	3	20	05	feeling
919-2	F	B+	38	3	26	07	picture
007-3	M	B+	35	3	19	08	even
291-3	M	B+	35	2	25	09	picture
444-3	F	B+	40	3	25	11	spelling
151-3	M	B+	39	3	23	13	spelling
001-2	M	C+	20	1	12	10	picture
410-2	M	B-	18	3	12	10	feeling
333-2	M	B-	10	1	16	07	spelling
136-2	M	B-	21	3	11	13	feeling
572-2	F	A-	22	1	14	08	sound
119-3	F	C	20	3	17	14	spelling
199-3	M	C	15	2	23	09	even
127-3	M	C	23	1	12	04	even

*MusBack = Musical Background. This column refers to the three variables concerning musical background: 10. Play a musical instrument; 11. Take music lessons; and 12. Play/sing in a musical organization. (See Table 11)
On this table, '0' refers to no musical background, '1' means the student answered "yes" to one of the background questions, '2' means the student answered "yes" to two of the background questions, and '3' means the student answered "yes" to all three musical background questions.

**LearnStyle = Learning Style. This column refers to the student's learning style preference as denoted on the ELSIE. 'Even' means that the student marked each column on the ELSIE evenly; no particular learning style preference was indicated.

It is interesting to note that five of the eight top scorers on the MAP were also among the top scorers on the PLAB, and five of the lowest scorers on the MAP were among the lowest scorers on the PLAB. Seven of the eight top scorers had strong musical backgrounds, indicating that pitch discrimination and musical background seem to be related. However, all eight subjects who scored low on the MAP had had musical background, as well; either they played/sang in a musical organization, played a musical instrument, or both. Three of the eight also took music lessons. These data seem to indicate that musical background does not correlate very strongly with pitch discrimination ability. Using the Pearson Product Moment Correlation, the following results were obtained: MAP with PLAY: $r = .292$, $p \leq .026$*; MAP with TAKE: $r = .366$, $p \leq .007$**; MAP with PLAYSING: $r = -.08$, $p \leq .30$. (See Table 15) The low r^2 indicates little shared variance.

As for learning style, three of the top scorers on the MAP scored highest in the spelling column on the ELSIE, indicating their preference for the written word. Two of the top scorers on the MAP scored highest in the picture column, also indicating visual orientation; two scored highest in the feeling column, indicating kinesthetic orientation; and one subject marked each column evenly, indicating no preference in learning style. These results seem to indicate that the majority of students with superior ability in pitch and sound discrimination (5 students) are visually-oriented. The learning style preferences among the lowest scorers on the MAP are more varied than those among the top scorers. Two subjects indicated spelling. one indicated picture, one indicated sound, two indicated feeling, and two indicated no preference, as their learning style preference. Using the Pearson Product Moment Correlation, it was found that none of the four learning styles correlated significantly with MAP scores. (See printout in Appendix D.)

Looking at general GPA scores, seven of the eight top scorers on the MAP had either an A- or a B+ as a general grade point average. Seven of the eight lowest scorers on the MAP had a B-, C+, or C as a general grade point average. These results seem to indicate a positive relationship between GPA and pitch discrimination ability. Using the Pearson Product Moment Correlation, $r = .348$, $p \leq .010$** (See Table 15)

Examining Table 14, two individual cases need mentioning. First, #666-2 achieved high scores on all three tests: 36/40 on the MAP, 26/30 on the PLAB, and 11/15 on the MLA. As for learning style, he marked each column evenly, indicating no preference. Although he achieved high scores, his general GPA is a C. These data seem to indicate that general GPA is not related to pitch discrimination, sound discrimination, or pronunciation ability. Looking at Table 15, however, we see that GPA is related to pitch discrimination. Other correlations with GPA are shown in the printout in Appendix D.

The second individual, #572-2, had an A- for her general GPA but achieved low scores on all three tests: 22/40 on the MAP, 14/30 on the PLAB, and 8/15 on the MLA. As for learning style, her preference was sound, indicating she learns best by listening. This is extremely interesting since all three tests were given aurally. She was the only subject of all sixteen top and low scorers on the MAP who preferred sound as a learning style.

Although many of these relationships were not mentioned in the research questions, it is interesting to note that scores on the MAP correlated significantly with many variables. (See Table 15)

TABLE 15: CORRELATIONS OF MAP WITH SEVEN OTHER VARIABLES

	MAP
Third quarter German grade:	$r = .415$, $p \leq .002$ **
General GPA:	$r = .348$, $p \leq .010$ **
Self-rated ability to speak German:	$r = .332$, $p \leq .013$ *
Self-rated ability to learn a second language:	$r = .316$, $p \leq .017$ *
The playing of a musical instrument:	$r = .292$, $p \leq .026$ *
Taking music lessons:	$r = .366$, $p \leq .007$ **
Scores on the PLAB:	$r = .557$, $p \leq .000$ **

2. There is no significant relationship between pitch discrimination and the ability to pronounce German phonemes correctly.

On the final days of the study, the MLA Cooperative Foreign Language Test - German, Form LA, Speaking Test was administered to determine students' abilities to mimic German phonemes in sentence context. The speaking tests were given individually and the students' responses were recorded on cassette tapes, which the investigator evaluated later. There were 15 specific sounds which were marked as either correct or wrong, according to the student's pronunciation of each sound. Out of 15 possible points, the maximum achieved score was 14 and the minimum achieved score was three, making the range 11 points. The mean of the distribution of scores was 8.06, the median was 8.20, the mode was 10.00, and the standard deviation was 2.84. (See Table 16)

TABLE 16: ANALYSIS OF THE MLA SPEAKING TEST

Mean:	8.06	Minimum score:	3
Median:	8.20	Maximum score:	14
Mode:	10.00	Range:	11
Standard Deviation:	2.84	Total Possible:	15

When MAP and MLA scores were correlated, the Pearson Product Moment Correlation was: $r = -.055$, $p \leq .360$. Using .05 as the level of significance, the null hypothesis of no relationship fails to be rejected. There is no significant relationship between pitch discrimination and the ability to pronounce German phonemes correctly.

By examining Table 14 it appears that scores on the MAP and scores on the MLA do not seem to be related. Only three of the eight top scorers on the MAP were among the top scorers on the MLA. Of the eight lowest scorers on the MAP, only one was among the lowest scorers on the MLA. The previously stated "r" value shows the negative relationship.

It is interesting to note how the subjects responded to particular words and phrases. Since the subjects were only in their second year of German, many of the words on the speaking test were new to them. Generally speaking, however, when the students heard a word which sounded like a worf they knew, they would say the word they knew, so that the phrase made more sense to them. For example, one phrase was: "Der Zug ist voll." A number of people said: "Der Sup ist kolt." Another example was the word "Geld." Since the students had not learned that word yet, but they had learned the colors, many people said: "gelb," instead of "Geld." One word which was difficult to discriminate on the cassette - "tauschen" - was mispronounced by everyone. Most people said "tausen." There was one phrase which everyone pronounced correctly:

"Meine Mutter ist zu Hause." All students had been familiar with this phrase before the speaking test was given.

Observing the fact that 29 out of 45 subjects pronounced fewer than ten German phonemes correctly, it needs to be mentioned that language tapes are never played in the German classroom. Thus, the students never listen to spoken German on tape.

Due to the subjectivity of the rating of the speaking test, a second rating was done of 20 randomly chosen tests. Intrarater reliability (relationship between first scoring and second scoring by the same rater) was .834, an acceptable reliability.

3. There is no significant relationship between cognitive style and the ability to pronounce German phonemes correctly.

The Edmonds Learning Style Identification Exercise (ELSIE) was administered on the first day of the study to discover which way each student learned most effectively. Students listened to 50 individual English words and reacted to each one by circling a letter under one of four headings: picture, spelling, sound, or feeling. In the picture column, out of 50 possible points, the maximum achieved score was 40 and the minimum achieved score was one, making the range 39 points. The mean of the distribution of scores in the picture column was 19.80, the median was 18.67, the mode was 18.00 and the standard deviation was 8.25. (See Table 17)

In the spelling column, out of 50 possible points, the maximum achieved score was 39 and the minimum achieved score was zero, making the range 39 points. The mean of the distribution of scores was 11.31,

the median was 9.42, the mode was 9.00, and the standard deviation was 8.53. (See Table 17)

In the sound column, out of 50 possible points, the maximum achieved score was 30 and the minimum achieved score was zero, making the range 30 points. The mean of the distribution of scores was 9.93, the median was 9.40, the mode was 12.00, and the standard deviation was 7.06. (See Table 17)

TABLE 17: ANALYSIS OF THE EDMONDS LEARNING STYLE IDENTIFICATION EXERCISE (ELSIE)

Picture Column

Mean:	19.80	Minimum score:	1
Median:	18.67	Maximum score:	40
Mode:	18.00	Range:	39
Standard Deviation:	8.25	Total possible:	50

Spelling Column

Mean:	11.31	Minimum score:	0
Median:	9.42	Maximum score:	39
Mode:	9.00	Range:	39
Standard Deviation:	8.53	Total possible:	50

Sound Column

Mean:	9.93	Minimum score:	0
Median:	9.40	Maximum score:	30
Mode:	12.00	Range:	30
Standard Deviation:	7.06	Total possible:	50

Feeling Column

Mean:	8.95	Minimum score:	0
Median:	9.00	Maximum score:	23
Mode:	0.00	Range:	23
Standard Deviation:	6.74	Total possible:	50

In the feeling column, out of 50 possible points, the maximum achieved score was 23 and the minimum achieved score was zero, making the range 23 points. The mean of the distribution of scores was 8.95, the median was 9.00, the mode was zero, and the standard deviation was 6.74. (See Table 17)

By examining the means of all four columns, it appears that the majority of the students learn most effectively by visualizing information, such as objects or pictures. The second highest preference of learning was by visualizing the written word. Third highest in learning style preference was listening to the spoken language without visualization; the lowest learning style preference was activity-oriented.

After administering and recording scores on the ELSIE, a separate analysis was done to examine reactions to abstract terms. Twelve abstract terms were identified and ten papers were chosen at random to analyze reactions to the abstract terms. The 12 words were: guilty, hope, fear, justice, shame, truth, hate, good, freedom, think, love, and above. The investigator thought that most abstract terms would stimulate a kinesthetic response. Six out of ten people reacted kinesthetically to the word "hate," identifying it as the term with the highest number of kinesthetic responses. Only one out of ten people reacted kinesthetically to the word "hope," making it the term with the lowest number of kinesthetic responses. (See Table 18)

When MLA scores and scores from each column on the ELSIE were correlated, the Pearson Product Moment Correlations were: MLA with picture column: $r = -.185$, $p \leq .112$; MLA with spelling column: $r = .278$, $p \leq .032$*; MLA with sound column: $r = -.093$, $p \leq .272$; and MLA with feeling column: $r = -.028$, $p \leq .427$. (See Table 19)

TABLE 18: ANALYSIS OF REACTIONS TO ABSTRACT TERMS (N=10)

ABSTRACT TERMS	REACTIONS			
	Feeling	Picture	Spelling	Sound
guilty	3	1	3	3
hope	1	0	4	5
fear	4	0	5	1
justice	3	2	1	4
shame	4	0	3	3
truth	5	0	2	3
hate	6	1	2	1
good	3	2	3	2
freedom	3	3	0	4
think	4	2	2	2
love	5	3	1	1
above	2	3	4	1

TABLE 19: CORRELATIONS BETWEEN MLA AND ELSIE COLUMNS

MLA

Picture column: $r = -.185$, $p \leq .112$

Spelling column: $r = .278$, $p \leq .032$*

Sound column: $r = -.093$, $p \leq .272$

Feeling column: $r = -.028$, $p \leq .427$

There is no significant relationship between scores in the picture column, sound column, or feeling column, and the ability to pronounce German phonemes correctly (scores on the speaking test). There seems to be, however, a significant relationship between scores on the spelling

column and scores on the speaking test, and the null hypothesis is, therefore, rejected for spelling.

A separate analysis was done to examine individual student performance on the speaking test compared with other variables. (See Table 20)

TABLE 20: ANALYSIS OF NINE TOP AND TEN LOWEST SCORERS ON THE MLA IN RELATION TO FOUR OTHER VARIABLES

ID#	Sex	GPA	MLA score	LearnStyle	PLAB score
192-2	F	B-	11	feeling	19
703-2	F	B	11	sound	17
666-2	M	C	11	even	26
136-2	M	B-	13	feeling	11
444-3	F	B+	11	spelling	25
119-3	F	C	14	spelling	17
530-3	M	B	13	picture	17
523-3	M	C	11	sound	15
151-3	M	B+	13	spelling	23
123-2	M	B-	05	sound	19
124-2	F	A-	05	feeling	20
116-3	M	B-	05	spelling	18
464-3	M	B-	05	feeling	22
849-3	M	C+	05	picture	15
246-3	F	B	03	even	23
622-3	F	B	04	sound	15
127-3	M	C	04	picture	12
911-3	F	B	03	feeling	15
947-3	F	B-	05	feeling	22

By examining Table 20, it appears that both high scorers and low scorers on the speaking test responded to the words in the learning style exercise in a variety of ways; no clear patterns emerged.

4. There is no significant relationship between cognitive style and the ability to discriminate sounds in a second language.

When PLAB scores and scores from each column on the ELSIE were correlated, the Pearson Product Moment Correlations were: PLAB with picture column: $r = .029$, $p \leq .425$; PLAB with spelling column: $r = .244$, $p \leq .053$; PLAB with sound column: $r = -.173$, $p \leq .129$; PLAB with feeling column: $r = -.164$, $p \leq .141$. (See Table 21)

TABLE 21: CORRELATIONS BETWEEN PLAB AND ELSIE COLUMNS

	PLAB
Picture column:	$r = .029$, $p \leq .425$
Spelling column:	$r = .244$, $p \leq .053$
Sound column:	$r = -.173$, $p \leq .129$
Feeling column:	$r = -.164$, $p \leq .141$

Using .05 as the level of significance, there is no significant relationship between scores on the picture column, sound column, or feeling column, and scores on the PLAB. There seems to be, however, an almost significant relationship between scores on the spelling column and scores on the PLAB. The null hypothesis of no relationship fails to be rejected.

Another separate analysis was done to examine individual student performance on the PLAB compared with three other variables. (See Table 22) Of the six highest scorers on the PLAB, none had marked sound as their learning style preference. Three of the six prefer pictures, two prefer spelling, or the written word, and one person marked all four columns evenly, indicating no preference. Thus, it seems that visual learners should perform well on sound discrimination tasks. However, using .05 as the level of significance, neither column, picture or spelling, have strong correlations with the PLAB.

TABLE 22 ANALYSIS OF SIX TOP AND SIX LOWEST SCORERS ON THE PLAB IN RELATION TO THREE OTHER VARIABLES

ID#	Sex	PLAB score	MLA score	LearnStyle
321-2	F	29	09	spelling
666-2	M	26	11	even
919-2	F	26	07	picture
291-3	M	25	09	picture
444-3	F	25	11	spelling
112-2	M	25	06	picture
001-2	M	12	10	picture
410-2	M	12	10	feeling
136-2	M	11	13	feeling
127-3	M	12	04	picture
727-2	M	12	06	sound
196-2	F	13	10	sound

5. There is no significant relationship between musical background and the ability to pronounce German phonemes correctly.

Musical background refers to three variables: whether the student plays a musical instrument, takes music lessons, or plays/sings in a musical organization. All subjects answered yes or no to these three statements on the student background questionnaire which was filled out on the first day of the study.

When scores on the speaking test were correlated with musical background, the Pearson Product Moment Correlations were: MLA with PLAY: $r = -.044$, $p \leq .386$; MLA with TAKE: $r = -.028$, $p \leq .428$; MLA with PLAYSING: $r = -.017$, $p \leq .456$. (See Table 23)

TABLE 23: CORRELATIONS BETWEEN MLA AND MUSICAL BACKGROUND

	Play a musical instrument	Take music lessons	Play/sing in a mus-organ
MLA	$r = -.044$ $p \leq .386$	$r = -.028$ $p \leq .428$	$r = -.017$ $p \leq .456$

There is no significant relationship between musical background and the ability to pronounce German phonemes correctly. Using .05 as the level of significance, the null hypothesis fails to be rejected.

It is interesting to look at individual cases. (See Table 24) All but one subject of the nine top scorers on the speaking test had had musical background. Eight of the nine top scorers play/sing in a musical organization, seven play a musical instrument, and six take music lessons. In addition, however, all of the lowest scorers on the

speaking test have had some musical background. Nine of the ten play a musical instrument, seven take music lessons, and nine play/sing in a musical organization.

TABLE 24: ANALYSIS OF NINE TOP AND TEN LOWEST SCORERS ON THE MLA IN RELATION TO MUSICAL BACKGROUND

ID #	MLA score	Play a musical instrument	Take music lessons	Play/sing in a mus-organ
192-2	11	yes	yes	yes
703-2	11	no	no	yes
666-2	11	no	no	no
136-2	13	yes	yes	yes
444-3	11	yes	yes	yes
119-3	14	yes	yes	yes
530-3	13	yes	yes	yes
523-3	11	yes	no	yes
151-3	13	yes	yes	yes
123-2	05	yes	yes	yes
124-2	05	yes	yes	yes
116-3	05	yes	no	yes
464-3	05	yes	yes	yes
849-3	05	yes	yes	yes
246-3	03	yes	yes	no
622-3	04	yes	yes	yes
127-3	04	no	no	yes
911-3	03	yes	no	yes
947-3	05	yes	yes	yes

6. There is no significant relationship between musical background and the ability to discriminate sounds in a second language.

When scores on the PLAB were correlated with musical background, the Pearson Product Moment Correlations were: PLAB with PLAY: $r = .291$, $p \leq .026$*; PLAB with TAKE: $r = .227$, $p \leq .067$; PLAB with PLAYSING: $r = -.026$, $p \leq .433$. (See Table 25)

TABLE 25: CORRELATIONS BETWEEN PLAB AND MUSICAL BACKGROUND

	Play a musical instrument	Take music lessons	Play/sing in a mus-organization
PLAB	$r = .291$	$r = .227$	$r = -.026$
	$p \leq .026$*	$p \leq .067$	$p \leq .433$

The only factor of musical background which relates, at the .05 level of significance, to sound discrimination is playing a musical instrument. The other two factors do not seem to correlate with sound discrimination. There is a significant relationship between playing a musical instrument and the ability to discriminate sounds in a second language, and therefore, the null hypothesis of no relationship is not rejected for TAKE and PLAYSING, but it is rejected for PLAY.

Individual cases were examined to compare musical background with the PLAB scores and GPA. (See Table 26) Five of the six top scorers on the sound discrimination test had had musical background. Five of the six play a musical instrument and play/sing in a musical organization; four take music lessons. Of the six lowest scorers on the sound discrimination

test, five had had musical background. Two of the six play a musical instrument and take music lessons; five play/sing in a musical organization.

TABLE 26: ANALYSIS OF SIX TOP AND SIX LOWEST SCORERS ON THE PLAB IN RELATION TO MUSICAL BACKGROUND AND GPA

ID #	GPA	PLAB score	MUSICAL BACKGROUND		
			Play a musical instrument	Take music lessons	Play/sing in a mus-organ
321-2	A	29	yes	yes	yes
666-2	C	26	no	no	no
919-2	B+	26	yes	yes	yes
291-3	B+	25	yes	no	yes
444-3	B+	25	yes	yes	yes
112-2	B	25	yes	yes	yes
001-2	C+	12	no	no	yes
410-2	B-	12	yes	yes	yes
136-2	B-	11	yes	yes	yes
127-3	C	12	no	no	yes
727-2	A-	12	no	no	yes
196-2	A	13	no	no	no

7. There is no significant relationship between the ability to discriminate sounds in a second language and the ability to pronounce German phonemes correctly.

When scores on the PLAB were correlated with scores on the MLA, the Pearson Product Moment Correlation was: $r = -.002$, $p \leq .494$. Using the .05 level of significance, the null hypothesis of no relationship

fails to be rejected. See Table 22 for display of individual cases.

8. There is no significant relationship between general GPA and the ability to discriminate sounds in a second language.

General GPA refers to the student's grade point average in all subject areas. Each subject filled in his/her general GPA on the student background questionnaire which was filled out on the first day of the study.

When GPA was correlated with PLAB, the Pearson Product Moment Correlation was: $r = .129$, $p \leq .200$. Using the .05 level of significance, the null hypothesis of no relationship fails to be rejected. See Table 26 for display of individual cases.

9. There is no significant relationship between general GPA and the ability to pronounce German phonemes correctly.

When GPA was correlated with MLA, the Pearson Product Moment Correlation was: $r = -.005$, $p \leq .486$. Using the .05 level of significance, the null hypothesis of no relationship fails to be rejected. See Table 20 for display of individual cases.

10. There is no significant relationship between sex and the ability to discriminate sounds in a second language.

When the variable 'sex' was correlated with PLAB, the Pearson Product Moment Correlation was: $r = .179$, $p \leq .119$. Using the .05 level of significance, the null hypothesis of no relationship fails to be

rejected. See Table 22 for display of individual cases.

11. There is no significant relationship between sex and the ability to pronounce German phonemes correctly.

When the variable 'sex' was correlated with MLA, the Pearson Product Moment Correlation was: $r = -.103$, $p \leq .249$. Using the .05 level of significance, the null hypothesis of no relationship fails to be rejected. See Table 20 for display of individual cases.

C. SUMMARY OF CHAPTER IV

In this chapter, the data were analyzed and discussed. The results of the analyses were discussed according to each null hypothesis and the significance of relationships between variables was examined by use of the Pearson Product Moment Correlation. The strongest correlation was between the variables SOUND and MUSAPT (the Pimsleur-Sound Discrimination test and the MAP-Melodic Variations subtest): $r = .557$, $p \leq .000$**. Other significant relationships were discovered between: MUSAPT and PLAY: $r = .292$, $p \leq .026$*; MUSAPT and GERMAN: $r = .415$, $p \leq .002$**; MUSAPT and GPA: $r = .348$, $p \leq .010$**; MUSAPT and SPEAK: $r = .332$, $p \leq .013$*; MUSAPT and LEARN: $r = .316$, $p \leq .017$*; MUSAPT and TAKE: $r = .366$, $p \leq .007$**; SPEAKTST and SPELLING: $r = .278$, $p \leq .032$*; SOUND and SPELLING: $r = .244$, $p \leq .053$; and SOUND and PLAY: $r = .291$, $p \leq .026$*. (See Table 27) Therefore, the following null hypotheses were rejected:

1. There is no significant relationship between pitch discrimination and the ability to discriminate sounds in a second language.
3. There is no significant relationship between cognitive style and the ability to pronounce German phonemes correctly.

6. There is no significant relationship between musical background and the ability to discriminate sounds in a second language.

TABLE 27: SIGNIFICANT RELATIONSHIPS (Using .05 as the level of significance)

	MUSAPT	SPEAKTST	SOUND
SOUND	r = .557 p≤ .000**		
PLAY	r = .292 p≤ .026*		r = .291 p≤ .026*
TAKE	r = .366 p≤ .007**		
GERMAN	r = .415 p≤ .002**		
GPA	r = .348 p≤ .010**		
SPEAK	r = .332 p≤ .013*		
LEARN	r = .316 p≤ .017*		
SPELLING		r = .278* p≤ .032	r = .244 p≤ .053

Both sex and GPA were found to have low correlations with sound discrimination and pronunciation ability in a second language. There was also no significant relationship between SOUND and SPEAKTST (sound discrimination and pronunciation ability in a second language): $r = -.002$, $p \leq .494$.

By examining individual performance, it was found that learning style had little effect on test taking ability. A variety of learning styles was preferred among both high and low scorers on all three tests. Thus, the individual cases seem to support the computer analysis.

Chapter Five will present findings, conclusions, and implications for further research.

CHAPTER V

SUMMARY, FINDINGS, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

V. SUMMARY, FINDINGS, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

A. SUMMARY

It is believed that some people have a particular talent or an aptitude for languages. However, many other factors play major roles in language learning. An individual's cognitive style indicates how one learns most effectively and, therefore, must be considered when discussing student learning factors. Another variable which may explain student success in second language learning is pitch discrimination ability. Research has shown that relationships exist between musical pitch discrimination, sound discrimination, and pronunciation of a second language (Arellano and Draper, 1; McCoy, 35).

In this study, the relationships among learning styles, pitch discrimination, sound discrimination, and pronunciation of German phonemes were investigated.

B. DESIGN OF THE STUDY

Two classes of eighth-grade students of German, at a junior high school in a southern suburb of Minneapolis, were used as subjects. There were 22 males and 23 females involved in the study. Of the 45 students, 23 were in one class and 22 were in the other. All students were administered three standardized tests and one non-standardized test: (1) the Pimsleur Language Aptitude Battery (PLAB)- Sound Discrimination test (42); (2) the MLA Cooperative Foreign Language Test - German, Form LA (MLA)- Speaking test (37); (3) the Gordon Musical Aptitude Profile (MAP)- Melodic Variations subtest (20); and (4) the Edmonds Learning Style Identification Exercise (ELSIE) (47). The students also filled out a background questionnaire pertaining to their musical background

and language learning ability.

The dependent variables, sound discrimination (scores on the PLAB) and pronunciation (scores on the MLA), were correlated with the independent variables, musical pitch acuity (scores on the MAP), learning style (scores on the ELSIE), general GPA, musical background, and sex, to determine significance of relationships. The Pearson Product Moment Correlation was the statistical technique used to analyze the data. The variables were entered into the computer using SCSS (Conversational SPSS): NOS, at the University of Minnesota Computer Center.

C. FINDINGS AND CONCLUSIONS

Prior to the study, the .05 level of significance was chosen for rejection of the null hypotheses. The findings of the study, in order of the hypotheses, are summarized below.

1. Scores on the MAP were correlated with scores on the PLAB and found to have a significant relationship: $r = .557$, $p \leq .000^{**}$. Therefore, it seems that pitch discrimination ability and sound discrimination ability are strongly related.

2. Scores on the MAP were correlated with scores on the MLA and found to have a non-significant negative relationship: $r = -.055$, $p \leq .360$. Therefore, it appears that pitch discrimination ability and pronunciation ability of German phonemes are not related.

3. Scores on the MLA were correlated with scores from each column on the ELSIE and found to have the following relationships: MLA with picture column: $r = -.185$, $p \leq .112$; MLA with spelling column: $r = .278$, $p \leq .032^{*}$; MLA with sound column: $r = -.093$, $p \leq .272$; MLA with feeling column: $r = -.028$, $p \leq .427$. Therefore, it appears

that pronunciation ability of German phonemes and learning by the written word are related.

4. Scores on the PLAB were correlated with scores from each column on the ELSIE and found to have the following relationships: PLAB with picture column: $r = .029$, $p \leq .425$; PLAB with spelling column: $r = .244$, $p \leq .053$; PLAB with sound column: $r = -.173$, $p \leq .129$; PLAB with feeling column: $r = -.164$, $p \leq .141$. Therefore, it appears that the only learning style mildly related with sound discrimination ability is spelling, or the written word.

5. Scores on the MLA were correlated with the musical background variables and found to have the following relationships: MLA with PLAY: $r = -.044$, $p \leq .386$; MLA with TAKE: $r = -.028$, $p \leq .428$; MLA with PLAYSING: $r = -.017$, $p \leq .456$. Therefore, it appears that pronunciation ability of German phonemes and musical background are not related.

6. Scores on the PLAB were correlated with the musical background variables and found to have the following relationships: PLAB with PLAY: $r = .291$, $p \leq .026$*; PLAB with TAKE: $r = .227$, $p \leq .067$; PLAB with PLAYSING: $r = -.026$, $p \leq .433$. Therefore, it appears that sound discrimination ability and the playing of a musical instrument are related.

7. Scores on the PLAB were correlated with scores on the MLA and found to have a non-significant negative relationship: $r = -.002$, $p \leq .494$. Therefore, it seems that sound discrimination ability and pronunciation ability of German phonemes are not related.

8. Scores on the PLAB were correlated with general GPA and found to have a non-significant relationship: $r = .129$, $p \leq .200$. Therefore, it appears that GPA and sound discrimination ability are not

related.

9. Scores on the MLA were correlated with general GPA and found to have a non-significant negative relationship: $r = -.005$, $p \leq .486$. Therefore, it seems that GPA and pronunciation ability of German phonemes are not related.

10. Scores on the PLAB were correlated with sex and found to have a non-significant relationship: $r = .179$, $p \leq .119$. Therefore, it appears that sound discrimination ability and sex are not related.

11. Scores on the MLA were correlated with sex and found to have a non-significant negative relationship: $r = -.103$, $p \leq .249$. Therefore, it seems that pronunciation ability of German phonemes and sex are not related.

Based on these findings, one can conclude that students with fine musical pitch acuity should also possess a strong ability to discriminate linguistic sounds. It also appears that students who depend on the written word should have a strong ability to discriminate linguistic sounds and to pronounce German phonemes correctly. Another conclusion could be made that students who play a musical instrument should possess a strong ability to discriminate linguistic sounds.

D. LIMITATIONS OF THE STUDY

As mentioned in Chapter One, there are several limitations to this study. First, the sample size was small and only one school was used. A wider study including more schools and more students might be more valid. Second, the ELSIE is not standardized. Third, only parts of the PLAB, the MLA, and the MAP were used, instead of the complete tests. Fourth, the condition of the recording of the MLA

speaking test was poor and, therefore, it was difficult for the students to understand some of the sounds spoken on the tape. Finally, strict randomization was not possible, because the classes were already in groups. Furthermore, 18 students in a so-called "gifted" class had been previously selected and placed in a separate group not used in this study. As a result, the two classes chosen perhaps did not contain a full range of ability levels.

E. IMPLICATIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

This study suggests several implications and recommendations for teachers, students, and school guidance counselors concerning musical aptitude, second language aptitude, and learning styles. First, students who score above average on musical aptitude tests, and specifically on tonal discrimination sections, should be encouraged to enroll in a second language. This study has indicated that students performing well on a melodic discrimination test also perform well on a linguistic sound discrimination test, and sound discrimination ability is vital in oral language learning.

Second, since it seems that the best language students are visually-oriented (i.e. they either see a mental image of a word spelled-out or of an object), it may be useful for elementary and junior high school teachers to provide activities that help students develop such visual orientation.

Third, teachers should become more aware of the various learning styles their students use and prefer. This study indicated that each individual reacts uniquely to individual words; no clear patterns emerged. Teachers should teach to all learners by varying their (the teacher's) teaching styles.

Fourth, school guidance counselors should encourage students who play musical instruments or who score above average on musical aptitude tests to enroll in a second language. Many students are greatly influenced by their guidance counselors in course selection and, therefore, it seems only fair that counselors advise their students of their aptitudes.

Finally, further research is needed using a larger sample drawn from a variety of school situations. To replicate this study, however, the testing instruments should be reexamined for their validity. The MLA speaking test, for example, in its present form, was not as useful as other speaking measures might be. Other studies should use specifically-developed and validated instruments to rate speaking. The relationship between pronunciation and sound discrimination ability was found to be non-significant, which may be due to the instruments used in this study.

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APPENDIX A

RESEARCH QUESTIONS

Lisa Fish
Plan B Paper

Research Questions

1. Is there a relationship between pitch discrimination and the ability to discriminate between sounds in a second language?

   (Correlate scores on the Musical Aptitude Profile - column 44,45 - with scores on the Pimsleur test - column 28,29.)

2. Is there a relationship between pitch discrimination and the ability to pronounce German phonemes correctly?

   (Correlate scores on the Musical Aptitude Profile - column 44,45 - with scores on the German speaking test - column 47,48.)

3. Is there a relationship between cognitive style and the ability to pronounce German phonemes correctly?

   (Correlate scores on the learning style test with scores on the German speaking test. Correlate column 31,32 with column 47,48. Correlate column 34,35 with 47,48. Correlate column 37,38 with 47,48. Correlate 40,41 with 47,48.) (In place of 31,32 use 33; for 34,35 use 36; for 37,38 use 39; for 40,41 use 42.)

4. Is there a relationship between cognitive style and the ability to discriminate between sounds in a second language?

   (Correlate scores on the learning style test with scores on the Pimsleur test. Correlate column 31,32 with 29,29. Correlate 34,35 with 28,29. Correlate column 37,38 with 28,29. Correlate column 40,41 with 28,29.)

5. Is there a relationship between musical background and the ability to pronounce German phonemes correctly?

   (Correlate column 22 with column 47,48. Correlate column 24 with column 47,48. Correlate column 26 with column 47,48.)

6. Is there a relationship between musical background and the ability to discriminate between sounds in a second language?

   (Correlate column 22 with column 28,29. Correlate column 24 with column 28,29. Correlate column 26 with column 28,29.)

7. Is there a relationship between the ability to discriminate sounds in a second language and the ability to pronounce German phonemes correctly?

   (Correlate scores on the Pimsleur test - column 28,29 - with scores on the German speaking test - column 47,48.)

8. Is there a relationship between general GPA and the ability to discriminate sounds in a second language?

   (Correlate column 16,17 with the Pimsleur scores - column 28,29.)

Research Questions

9. Is there a relationship between GPA and the ability to pronounce German phonemes correctly?

   (Correlate column 16,17 with the speaking test scores - column 47,48.)

10. Is there a relationship between sex and the ability to discriminate sounds in a second language?

    (Correlate column 12 with the Pimsleur scores - column 28,29.)

11. Is there a relationship between sex and the ability to pronounce German phonemes correctly?

    (Correlate column 12 with the speaking test scores - column 47,48.)

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Column Numbers For Computer Coding

1,2,3 - Identification number

5 - Class period

7,8 - Age

10 - Grade level

12 - Sex (1=male, 2=female)

14,15 - Third quarter German grade (12=A+, 11=A, 10=A-, 9=B+, 8=B, 7=B-, 6=C+, 5=C, 4=C-, 3=D+, 2=D, 1=D-)

16,17 - General GPA (same 12 - 1 scale as above)

18 - Personally-rated ability to speak German (5 is best, 1 is lowest)

20 - Personally-rated ability to learn languages (5 is best, 1 is lowest)

22 - Play a musical instrument (1=yes, 2=no)

24 - Take music lessons (1=yes, 2=no)

26 - Play/sing in musical organization (1=yes, 2=no)

28,29 - score on the Pimsleur Sound Discrimination test (30 possible)

31,32 - score on the picture column of the learning style test (50 possible)

34,35 - score on the spelling column of the learning style test (50 possible)

37,38 - score on the sound column of the learning style test (50 possible)

40,41 - score on the feeling column of the learning style test (50 possible)

44,45 - score on the Gordon Musical Aptitude Profile (40 possible)

47,48 - score on the German speaking test (15 possible)

50,51 - score of second rating on the German speaking test (15 possible)
(Correlate 47,48 with 50,51 for intrarater reliability.)

33 - band score of learning style test (picture column)

36 - band score of learning style test (spelling column)

39 - band score of learning style test (sound column)

42 - band score of learning style test (feeling column)

Band	1 Visualization	2 Written Word	3 Listening	4 Activity
+4	39-50	21-50	23-50	27-50
+3	35-38	18-20	18-22	21-26
+2	30-34	16-17	16-17	17-20
+1	20-29	14-15	14-15	13-16
0	12-19	8-13	9-13	6-12
-1	7-11	7-8	7-8	3-5
-2	4-6	5-6	5-6	2
-3	2-3	3-4	3-4	1
-4	0-1	0-2	0-2	0

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APPENDIX B

IMPLIED CONSENT

DATE: March 8, 1984

RE: "M.A. Plan B Paper"

Dear Ms. Fish:

We have determined that the referenced study is covered under exemption category:

___ 1) Conducted in Educational Settings
_X_ 2) Educational Tests
___ 3) Survey/Interview Procedures
___ 4) Observation
_X_ 5) Secondary Use of Data
___ 6) Research Conducted by, or Subject to Approval of, DHHS
___ 7) Survey/Interviews of Public Figures.

Upon receipt of this card, you may begin your research. If you have any questions, please call me at 373-9895. The Committee wishes you every success with this research.

Anne Munro

Anne Munro
Administrative Assistant

March 22, 1984

Dear Parent/Guardian:

I, Lisa Fish, a graduate student at the University of Minnesota, will be conducting a study at Nicollet Junior High School to fulfill my requirements for the Master's Degree Program in Second Languages and Cultures Education. The study is designed to look at relationships between musical pitch discrimination, learning style, sound discrimination, and pronunciation of German phonemes. I hope to find out whether learning style and musical pitch discrimination play roles in students' abilities to perceive and produce sounds in the German language.

To perform the study, I will be administering four tests to two sections of eighth-grade German students. The scores will be examined and correlated to look for relationships among the variables. No grades will be given for these tests.

On the first day of the study, the students will be asked to fill out a background questionnaire pertaining to their musical background. They will also be asked to identify themselves with a three-digit number. These numbers will be used in place of names to conceal identities.

The tests will be administered to the 2nd and 3rd period eighth-grade German classes on the following dates: April 6, 10, 16, 18, and 23. The Gordon Musical Aptitude Profile - Melodic Variations subtest, the Pimsleur Language Aptitude Battery - Sound Discrimination subtest, and the Reinert Learning Style Exercise will be administered to each class separately. The MLA Cooperative Foreign Language Test - German Form LA-Speaking test will be given to each subject individually.

If for some reason you wish your son/daughter not to take part in my study, please contact Mrs. Susan Berger at Nicollet Junior High School.

Thank you very much.

Sincerely,

Lisa Fish

Lisa Fish

APPENDIX C

INSTRUMENTS

INTERVIEW SCHEDULE

This interview was conducted with the cooperating teacher on April 10, 1984.

1. What is the approximate community population of this school district?

   37,000

2. Do the majority of the students come from privately owned homes?

   Yes

3. Do the majority of the students live with both parents?

   Yes, by a slim margin

4. What is the number of schools in this district?

   Elementary 8 Junior High 2 Senior High 1

5. Do you feel the community is interested in the education of its children?

   Yes!

6. What is the enrollment of this junior high? 1307

7. How many males? 673 females? 634

8. How many students study foreign languages? 781 Male 348 Female 433

9. In which languages? Totals: German 365 French 146 Spanish 270

   Eighth grade: German 102 French 51 Spanish 78

10. Are foreign languages elective or required courses? elective

11. What are the electives eighth-graders have to choose from?

    German, Spanish, French, Developmental Reading, Typing, Band, Chorus

12. How many electives may an eighth-grader choose? Two (They meet every other day.)

13. Did you live or study in Germany? Yes

14. How well do you feel the majority of your eighth-grade German students discriminate sounds in German? 5 (4) 3 2 1

    (Five is highest, One is lowest)

15. How well do you feel the majority of your eighth-grade German students pronounce German sounds? 5 (4) 3 2 1

INTERVIEW SCHEDULE

This interview was conducted with the cooperating teacher on April 10, 1984.

1. What is the approximate community population of this school district?

   37,000

2. Do the majority of the students come from privately owned homes?

   Yes

3. Do the majority of the students live with both parents?

   Yes, by a slim margin

4. What is the number of schools in this district?

   Elementary 8 Junior High 2 Senior High 1

5. Do you feel the community is interested in the education of its children?

   Yes!

6. What is the enrollment of this junior high? 1307

7. How many males? 673 females? 634

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    German, Spanish, French, Developmental Reading, Typing, Band, Chorus

12. How many electives may an eighth-grader choose? Two (They meet every other day.)

13. Did you live or study in Germany? Yes

14. How well do you feel the majority of your eighth-grade German students discriminate sounds in German? 5 (4) 3 2 1

    (Five is highest, One is lowest)

15. How well do you feel the majority of your eighth-grade German students pronounce German sounds? 5 (4) 3 2 1

16. Do you feel the majority of your eighth-grade German students have a strong ability to learn another language? 5 4 (3) 2 1

17. Which textbook do you use? German Today, One, the 1976 edition

18. Do you use tapes in class? No

19. How many minutes of each 46-minute class period, generally speaking, do your students speak in German? About 25 minutes

20. What type of speaking?(ie.: answering questions, reading dialogs) role playing, guided practice, answering questions, reading dialogs, giving skits

Name Name

April 1984

Student Background Questionnaire

Information provided on this sheet will be used in this study and used in no other way. To conceal identities the names will be cut off the sheets before I see them.

Assign yourself a three-digit number ___ - ___ - ___

(This number needs to be memorized for further information.)

Age _____ Sex (Circle one) M F Grade _____

Class Period (Circle one) 2nd 3rd

How would you personally rate your own ability to speak German? (Circle the most appropriate number; "5" is very strong and "1" is very weak.)

5 4 3 2 1

How would you personally rate your own ability to learn another language? (Circle the most appropriate number; "5" indicates very high ability to learn another language and "1" indicates very low ability for language learning.)

5 4 3 2 1

Musical Background

I play a musical instrument. (Circle one) Yes No

If yes - Number of years _____

I take music lessons. (Circle one) Yes No

If yes - Number of years _____

I play in band. (Circle one) Yes No

I play in orchestra. (Circle one) Yes No

I sing in choir. (Circle one) Yes No

Estimate of GPA in all subjects _____

Student Grade in German class (3rd Quarter) _____ (Teacher fill in)

Instructions for ELSIE

This exercise is designed to identify how individuals learn most efficiently. This is not a test, for there are no right or wrong answers. In this exercise you will hear a total of fifty single English words. Each word is a common word which you should be familiar with. As you hear each word, observe your own immediate reaction - notice what goes on inside your head. Most probably for each word you will have one of four responses: either(1) you will see a picture of some object or activity, or (2) you will picture in your mind the word spelled out, or (3) you will have no mental image but will only hear the sound of the word, or (4) you may have some physical or emotional response, such as a tightening of a muscle or a feeling such as warmth, sorrow, etc. Remember that this is not a test of word association - it not important which other word or picture you might think of, but only the nature of your own immediate reaction to the word itself.

On your answer sheet circle the letter in the appropriate column for your own response to each word. Each word will be read only once, since the important answer is your first response to the word, not what you may think of after thinking about the word. Here is an example. Suppose you hear the word "hold." One person might see the hold of a ship or see one wrestler holding another. In this case, he would circle letter a. Notice that it does not matter what the visual image is, only that the word brings to mind some visual image (picture). Another person might see the word h-o-l-d spelled out. He would circle letter b. A third person might have no visual image at all, but simply hears the word and understands the meaning from the sound alone. He would circle letter c. Finally, still another person might feel a tensing of his arm muscles as if he were holding an object, or he might feel as if someone were holding him. In either case, that person would circle letter d. Remember to circle only one letter for each word. Your first response is the most important one. Each word will be read only once. Any questions?

ELSIE

Edmonds Learning Style Identification Exercise

1. pool
2. tall
3. summer
4. long
5. house
6. guilty
7. chicken
8. strange
9. liar
10. beautiful
11. grass
12. hope
13. yellow
14. fear
15. five
16. God
17. read
18. foot
19. justice
20. baby
21. enemy
22. bag
23. shame
24. street
25. truth
26. story
27. happy
28. ground
29. hate
30. talk
31. ocean
32. good
33. paint
34. down
35. freedom
36. letter
37. think
38. love
39. running
40. ugly
41. law
42. angry
43. friend
44. paper
45. warm
46. above
47. kill
48. swim
49. hungry
50. bad

Class Period 2nd 3rd

Number ___ - ___

Edmonds Learning Style Identification Exercise (ELSIE)

Following the instructions, each of the fifty words will be read once. On this answer sheet, circle the letter in the appropriate column for your own response to each word.

	Picture	Spelling	Sound	Feeling		Picture	Spelling	Sound	Feeling
1.	a.	b.	c.	d.	26.	a.	b.	c.	d.
2.	a.	b.	c.	d.	27.	a.	b.	c.	d.
3.	a.	b.	c.	d.	28.	a.	b.	c.	d.
4.	a.	b.	c.	d.	29.	a.	b.	c.	d.
5.	a.	b.	c.	d.	30.	a.	b.	c.	d.
6.	a.	b.	c.	d.	31.	a.	b.	c.	d.
7.	a.	b.	c.	d.	32.	a.	b.	c.	d.
8.	a.	b.	c.	d.	33.	a.	b.	c.	d.
9.	a.	b.	c.	d.	34.	a.	b.	c.	d.
10.	a.	b.	c.	d.	35.	a.	b.	c.	d.
11.	a.	b.	c.	d.	36.	a.	b.	c.	d.
12.	a.	b.	c.	d.	37.	a.	b.	c.	d.
13.	a.	b.	c.	d.	38.	a.	b.	c.	d.
14.	a.	b.	c.	d.	39.	a.	b.	c.	d.
15.	a.	b.	c.	d.	40.	a.	b.	c.	d.
16.	a.	b.	c.	d.	41.	a.	b.	c.	d.
17.	a.	b.	c.	d.	42.	a.	b.	c.	d.
18.	a.	b.	c.	d.	43.	a.	b.	c.	d.
19.	a.	b.	c.	d.	44.	a.	b.	c.	d.
20.	a.	b.	c.	d.	45.	a.	b.	c.	d.
21.	a.	b.	c.	d.	46.	a.	b.	c.	d.
22.	a.	b.	c.	d.	47.	a.	b.	c.	d.
23.	a.	b.	c.	d.	48.	a.	b.	c.	d.
24.	a.	b.	c.	d.	49.	a.	b.	c.	d.
25.	a.	b.	c.	d.	50.	a.	b.	c.	d.

Pimsleur Language Aptitude Battery

Identification Number ___ - ___ - ___

Class Period (Circle one) 2nd 3rd

Sound Discrimination - Fill in the oval under the word you hear.

1.	cabin	boa		16.	cabin	boa	friend
	O	O			O	O	O
2.	cabin	boa		17.	cabin	boa	friend
	O	O			O	O	O
3.	cabin	boa		18.	cabin	boa	friend
	O	O			O	O	O
4.	cabin	boa		19.	cabin	boa	friend
	O	O			O	O	O
5.	cabin	boa		20.	cabin	boa	friend
	O	O			O	O	O
6.	cabin	boa		21.	cabin	boa	friend
	O	O			O	O	O
7.	cabin	boa		22.	cabin	boa	friend
	O	O			O	O	O
8.	boa	friend		23.	cabin	boa	friend
	O	O			O	O	O
9.	boa	friend		24.	cabin	boa	friend
	O	O			O	O	O
10.	boa	friend		25.	cabin	boa	friend
	O	O			O	O	O
11.	boa	friend		26.	cabin	boa	friend
	O	O			O	O	O
12.	boa	friend		27.	cabin	boa	friend
	O	O			O	O	O
13.	boa	friend		28.	cabin	boa	friend
	O	O			O	O	O
14.	boa	friend		29.	cabin	boa	friend
	O	O			O	O	O
15.	boa	friend		30.	cabin	boa	friend
	O	O			O	O	O

9-72230

MUSICAL APTITUDE PROFILE

MRC ANSWER SHEET

TEST T — TONAL IMAGERY

BEGIN HERE

PART I
MELODY (T_1)

PRACTICE SONGS

1A L D ?
1B D ?

1A	L	D	?	6A	L	D	?	11A	L	D	?	16A	L	D	?
1B		D	?	6B		D	?	11B		D	?	16B		D	?
2A	L	D	?	7A	L	D	?	12A	L	D	?	17A	L	D	?
2B		D	?	7B		D	?	12B		D	?	17B		D	?
3A	L	D	?	8A	L	D	?	13A	L	D	?	18A	L	D	?
3B		D	?	8B		D	?	13B		D	?	18B		D	?
4A	L	D	?	9A	L	D	?	14A	L	D	?	19A	L	D	?
4B		D	?	9B		D	?	14B		D	?	19B		D	?
5A	L	D	?	10A	L	D	?	15A	L	D	?	20A	L	D	?
5B		D	?	10B		D	?	15B		D	?	20B		D	?

Identification number __ - __

Class period - (Circle one) 2nd 3rd

I. D.# _____

Period ____

Scoring Form for SPEAKING TEST

		R	W
Mimicry:	1	.....	.....
	2	.....	.....
	3	.....	.....
	4	.....	.....
	5	.....	.....
	6	.....	.....
	7	.....	.....
	8	.....	.....
	9	.....	.....
	10	.....	.....
	11	.....	.....
	12	.....	.....
	13	.....	.....
	14	.....	.....
	15	.....	.....
Oral Reading:			
Critical	16	.....	.....
Features	17	.....	.....
	18	.....	.....
	19	.....	.....
	20	.....	.....
	21	.....	.....
	22	.....	.....
	23	.....	.....
	24	.....	.....
	25	.....	.....

Total R's (Items 1-25) .....

Oral Reading:

Reading Fluency

5	4	3	2	1	0

Circle one digit and copy it beside item number. 26 .....

Raw Score (Items 1-26) ____

Total this column and transfer the score to space provided at the top of next column.

Raw Score: (Items 1-26) .....*

Questions: Circle one digit for each question and copy it beside item number.

Picture 1	3 2 1 0	27 .....*
Picture 2	3 2 1 0	28 .....*
Picture 3	3 2 1 0	29 .....*
Picture 4	3 2 1 0	30 .....*

Descriptions: Circle one digit for each item and copy it beside item number.

Single picture

Vocabulary	5 4 3 2 1 0	31 .....*
Pronunciation	5 4 3 2 1 0	32 .....*
Structure	5 4 3 2 1 0	33 .....*
Fluency	5 4 3 2 1 0	34 .....*

4-Picture Sequence

Vocabulary	5 4 3 2 1 0	35 .....*
Pronunciation	5 4 3 2 1 0	36 .....*
Structure	5 4 3 2 1 0	37 .....*
Fluency	5 4 3 2 1 0	38 .....*

Total Speaking Raw Score:

Add all numbers marked with an asterisk. Enter this total in box. Maximum raw score for the Speaking test is 82.

Transfer this score to Speaking Raw Score box on cover.

To the Student: DO NOT WRITE ON THIS PAGE.

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APPENDIX D

RAW DATA

```
LOGFILE OK
PROCEDURE?
UNIV CLASS GRADE TO PLAYSING
STATISTICS?
ALL
CELLS FOR FREQUENCY TABLES?

DISPLAY?
CELLS


CLASS  CLASS PERIOD

 VALUE        N  TOT P   NM P  CUM P  LABEL

     2       23   51.1   51.1   51.1
     3       22   48.9   48.9  100.0

TOTAL N = 45     MISSING N = 0

GRADE  GRADE LEVEL

 VALUE        N  TOT P   NM P  CUM P  LABEL

     8       45  100.0  100.0  100.0

TOTAL N = 45     MISSING N = 0

SEX  SUBJECT'S GENDER

 VALUE        N  TOT P   NM P  CUM P  LABEL

     1       22   48.9   48.9   48.9  MALE
     2       23   51.1   51.1  100.0  FEMALE

TOTAL N = 45     MISSING N = 0
```

Nominal

Nominal

Nominal

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GERMAN THIRD QUARTER GERMAN GRADE

Continuous Interval

VALUE	N	TOT P	NM P	CUM P	LABEL
3	1	2.2	2.2	2.2	D
5	3	6.7	6.7	8.9	C-
6	5	11.1	11.1	20.0	C
7	5	11.1	11.1	31.1	C+
8	11	24.4	24.4	55.6	B
9	6	13.3	13.3	68.9	B+
10	4	8.9	8.9	77.8	A-
11	10	22.2	22.2	100.0	A

TOTAL N = 45 MISSING N = 0

GPA GENERAL GPA

Continuous Interval

VALUE	N	TOT P	NM P	CUM P	LABEL
5	6	13.3	13.3	13.3	C-
6	5	11.1	11.1	24.4	C
7	8	17.8	17.8	42.2	C+
8	12	26.7	26.7	68.9	B
9	6	13.3	13.3	82.2	B+
10	7	15.6	15.6	97.8	A-
11	1	2.2	2.2	100.0	A

TOTAL N = 45 MISSING N = 0

SPEAK SELF-RATED ABILITY TO SPEAK GERMAN

Interval (Continuous)

VALUE	N	TOT P	NM P	CUM P	LABEL
2	2	4.4	4.4	4.4	POOR
3	11	24.4	24.4	28.9	FAIR
4	22	48.9	48.9	77.8	GOOD
5	10	22.2	22.2	100.0	EXCELLENT

TOTAL N = 45 MISSING N = 0

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LEAPN SELF-RATED ABILITY TO LEARN LANGUAGES

Interval (Continuous)

VALUE	N	TOT P	NM P	CUM P	LABEL
1	1	2.2	2.2	2.2	BAD
2	5	11.1	11.1	13.3	POOR
3	17	37.8	37.8	51.1	FAIR
4	17	37.8	37.8	88.9	GOOD
5	5	11.1	11.1	100.0	EXCELLENT

TOTAL N = 45 MISSING N = 0

PLAY PLAY A MUSICAL INSTRUMENT?

Nominal

VALUE	N	TOT P	NM P	CUM P	LABEL
1	35	77.8	77.8	77.8	YES
2	10	22.2	22.2	100.0	NO

TOTAL N = 45 MISSING N = 0

TAKE TAKE MUSIC LESSONS?

Nominal

VALUE	N	TOT P	NM P	CUM P	LABEL
1	26	57.8	57.8	57.8	YES
2	19	42.2	42.2	100.0	NO

TOTAL N = 45 MISSING N = 0

PLAYSING PLAY-SING IN MUSICAL ORGANIZATION?

Nominal

VALUE	N	TOT P	NM P	CUM P	LABEL
1	40	88.9	88.9	88.9	YES
2	5	11.1	11.1	100.0	NO

TOTAL N = 45 MISSING N = 0

DISPLAY?

VARIABLE LIST?
/LIST NAMES

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POSITIONAL LIST OF VARIABLES

1 SEQNUM	2 SUBFILE	3 CASWGT	4 ID	5 CLASS
6 AGE	7 GRADE	8 SEX	9 GERMAN	10 GPA
11 SPEAK	12 LEARN	13 PLAY	14 TAKE	15 PLAYSING
16 SOUND	17 PICTURE	18 SNDPICT	19 SPELLING	20 SNDSPELL
21 SNDCOL	22 SNDSND	23 FEELING	24 SNDFEEL	25 MUSAPT
26 SPEAKTST	27 SECRATE	28 SPSS0001		

```
VARIABLE LIST?
SOUND TO SECRATE
DISPLAY?
STAT
```

SOUND PIMSLEUR SOUND DISCRIMINATION TEST SCORE

30 possible

```
    MEAN = 18.467
 STD DEV = 4.581
    MODE = 19.000
  MEDIAN = 18.250
SKEWNESS = .253
KURTOSIS = -.778
 STD ERR = .683
VARIANCE = 20.982
 MINIMUM = 11.000
 MAXIMUM = 29.000
   RANGE = 18.000
     SUM = 831.000

TOTAL N = 45    MISSING N = 0
```

PICTURE LEARNING STYLE TEST SCORE - PICTURE COLU

50 possible

```
    MEAN = 19.800
 STD DEV = 8.244
    MODE = 18.000
  MEDIAN = 19.667
SKEWNESS = .452
KURTOSIS = .427
 STD ERR = 1.230
VARIANCE = 68.027
 MINIMUM = 1.000
 MAXIMUM = 40.000
   RANGE = 39.000
     SUM = 891.000

TOTAL N = 45    MISSING N = 0
```

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BNDPICT BAND SCORE LEARNING STYLE TEST SCORE - P

MEAN	4.467
STD DEV	1.272
MODE	4.000
MEDIAN	4.375
SKEWNESS	.078
KURTOSIS	4.516
STD ERR	.190
VARIANCE	1.618
MINIMUM	.000
MAXIMUM	8.000
RANGE	8.000
SUM	201.000

TOTAL N = 45 MISSING N = 0

SPELLING LEARNING STYLE TEST SCORE - SPELLING COL

50 possible

MEAN	11.311
STD DEV	8.533
MODE	9.000
MEDIAN	9.417
SKEWNESS	1.305
KURTOSIS	2.142
STD ERR	1.272
VARIANCE	72.810
MINIMUM	.000
MAXIMUM	39.000
RANGE	39.000
SUM	509.000

TOTAL N = 45 MISSING N = 0

BNDSPELL BAND SCORE LEARNING STYLE TEST SCORE - S

MEAN	3.867
STD DEV	2.464
MODE	4.000
MEDIAN	3.923
SKEWNESS	.161
KURTOSIS	-.957
STD ERR	.367
VARIANCE	6.073
MINIMUM	.000
MAXIMUM	8.000
RANGE	8.000
SUM	174.000

TOTAL N = 45 MISSING N = 0

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SNDCOL LEARNING STYLE TEST SCORE - SOUND COLUMN

50 possible

MEAN	9.933
STD DEV	7.063
MODE	12.000
MEDIAN	9.400
SKEWNESS	.836
KURTOSIS	.777
STD ERR	1.053
VARIANCE	49.882
MINIMUM	.000
MAXIMUM	30.000
RANGE	30.000
SUM	447.000

TOTAL N = 45 MISSING N = 0

BADSND LEARNING STYLE TEST SCORE - SOUND COLUMN

MEAN	3.444
STD DEV	2.427
MODE	4.000
MEDIAN	3.765
SKEWNESS	.191
KURTOSIS	-.750
STD ERR	.362
VARIANCE	5.889
MINIMUM	.000
MAXIMUM	8.000
RANGE	8.000
SUM	155.000

TOTAL N = 45 MISSING N = 0

FEELING LEARNING STYLE TEST SCORE - FEELING COLU

50 possible

MEAN	8.956
STD DEV	6.745
MODE	.000
MEDIAN	9.000
SKEWNESS	.331
KURTOSIS	-.352
STD ERR	1.006
VARIANCE	45.493
MINIMUM	.000
MAXIMUM	23.000
RANGE	23.000
SUM	403.000

TOTAL N = 45 MISSING N = 0

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BNOFEEL LEARNING STYLE TEST SCORE - FEELING COLU

MEAN	3.556
STD DEV	2.040
MODE	4.000
MEDIAN	3.867
SKEWNESS	-.336
KURTOSIS	-.617
STD ERR	.304
VARIANCE	4.162
MINIMUM	.000
MAXIMUM	7.000
RANGE	7.000
SUM	160.000

TOTAL N = 45 MISSING N = 0

MUSAPT

MEAN	28.022
STD DEV	6.148
MODE	30.000
MEDIAN	28.375
SKEWNESS	-.429
KURTOSIS	.864
STD ERR	.916
VARIANCE	37.795
MINIMUM	10.000
MAXIMUM	40.000
RANGE	30.000
SUM	1261.000

40 possible

TOTAL N = 45 MISSING N = 0

SPEAKTST

MEAN	8.067
STD DEV	2.340
MODE	10.000
MEDIAN	8.200
SKEWNESS	.123
KURTOSIS	-.907
STD ERR	.423
VARIANCE	8.064
MINIMUM	3.000
MAXIMUM	14.000
RANGE	11.000
SUM	363.000

15 possible

TOTAL N = 45 MISSING N = 0

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SECPATE

MEAN	8.200
STD DEV	2.687
MODE	6.000
MEDIAN	7.333
SKEWNESS	.650
KURTOSIS	-.159
STD ERR	.601
VARIANCE	7.22[illegible]
MINIMUM	4.000
MAXIMUM	14.000
RANGE	10.000
SUM	164.000

15 possible

TOTAL N = 45 MISSING N = 25

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CORRELATION, N CASES, SIGNIFICANCE

	AGE	SEX	GERMAN	GPA	SPEAK	LEARN	PLAY
AGE	1.000	-.070	-.119	-.016	.012	-.182	-.159
	45	45	45	45	45	45	45
		.324	.218	.458	.469	.116	.148
SEX	-.070	1.000	.337	.261	-.249	-.354	.226
	45	45	45	45	45	45	45
	.324		.012	.042	.050	.009	.068
GERMAN	-.119	.337	1.000	.725	.369	.391	.009
	45	45	45	45	45	45	45
	.218	.012		.000	.006	.004	.477
GPA	-.016	.261	.725	1.000	.282	.414	.036
	45	45	45	45	45	45	45
	.458	.042	.000		.030	.002	.407
SPEAK	.012	-.249	.369	.282	1.000	.561	.060
	45	45	45	45	45	45	45
	.469	.050	.006	.030		.000	.348
LEARN	-.182	-.354	.391	.414	.561	1.000	.085
	45	45	45	45	45	45	45
	.116	.009	.004	.002	.000		.289
PLAY	-.159	.226	.009	.036	.060	.085	1.000
	45	45	45	45	45	45	45
	.148	.068	.477	.407	.348	.289	
TAKE	-.237	.244	.119	.041	.050	.022	.625
	45	45	45	45	45	45	45
	.058	.053	.219	.394	.371	.443	.000
PLAYSING	.030	-.063	-.361	-.235	-.227	-.294	.151
	45	45	45	45	45	45	45
	.422	.341	.007	.060	.067	.025	.161
SOUND	-.164	.179	.238	.129	.027	.220	.291
	45	45	45	45	45	45	45
	.140	.119	.058	.200	.431	.074	.026
PICTURE	.197	.021	.159	.225	.247	.235	.105
	45	45	45	45	45	45	45
	.097	.449	.148	.069	.051	.029	.247
BNDPICT	.185	.003	.061	.130	.135	.138	.071
	45	45	45	45	45	45	45
	.112	.476	.345	.193	.112	.108	.322

Circled correlations are numbered according to the hypotheses discussed in the study.

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SPELLING	.015	.120	.076	.074	-.167	-.146	.064
	45	45	45	45	45	45	45
	.461	.215	.310	.315	.136	.170	.338
BNDSPELL	.085	.056	-.009	-.021	-.111	-.174	-.029
	45	45	45	45	45	45	45
	.290	.358	.477	.446	.234	.126	.424
SNDCOL	-.159	-.079	.113	.016	.031	.001	-.265
	45	45	45	45	45	45	45
	.149	.302	.229	.459	.421	.497	.039
BNDSND	-.104	-.073	.144	-.007	.038	-.029	-.324
	45	45	45	45	45	45	45
	.248	.305	.174	.482	.403	.424	.015
FEELING	-.094	-.093	-.409	-.335	-.122	-.166	.069
	45	45	45	45	45	45	45
	.270	.271	.003	.005	.211	.139	.327
BNDFEEL	-.066	-.127	-.334	-.307	-.059	-.123	.068
	45	45	45	45	45	45	45
	.334	.202	.012	.020	.351	.211	.329
MUSAPT	-.270	.172	.415	.348	.332	.316	.292
	45	45	45	45	45	45	45
	.036	.130	.002	.010	.013	.017	.026
SPEAKTST	-.014	-.103	-.137	-.005	-.106	-.029	-.044
	45	45	45	45	45	45	45
	.463	.249	.185	.486	.244	.425	.386
SECRATE	-.504	.038	-.107	.205	-.025	.195	.383
	20	20	20	20	20	20	20
	.012	.437	.327	.193	.458	.205	.048

	TAKE	PLAYSING	SOUND	PICTURE	BNDPICT	SPELLING	BNDSPELL
AGE	-.237	.030	-.164	.197	.185	.015	.085
	45	45	45	45	45	45	45
	.058	.422	.140	.097	.112	.461	.290
SEX	.244	-.063	.179	.020	.009	.121	.056
	45	45	45	45	45	45	45
	.053	.341	.119	.449	.476	.215	.358
GERMAN	.119	-.361	.238	.159	.061	.076	-.009
	45	45	45	45	45	45	45
	.219	.007	.058	.148	.345	.310	.477
GPA	.041	-.235	.129	.225	.130	.074	-.021
	45	45	45	45	45	45	45
	.394	.060	.200	.069	.198	.315	.446

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SPEAK	.050	-.227	.027	.247	.185	-.167	-.111
	45	45	45	45	45	45	45
	.371	.067	.431	.051	.112	.136	.234
LEARN	.022	-.294	.220	.295	.188	-.146	-.174
	45	45	45	45	45	45	45
	.443	.025	.074	.029	.108	.170	.126
PLAY	.625	.151	.291	.105	.071	.064	-.329
	45	45	45	45	45	45	45
	.000	.161	.026	.247	.322	.338	.424
TAKE	1.000	-.016	.227	.134	.031	-.036	-.158
	45	45	45	45	45	45	45
		.459	.067	.191	.420	.405	.151
PLAYSING	-.016	1.000	-.026	-.225	-.094	.122	.097
	45	45	45	45	45	45	45
	.459		.433	.068	.270	.212	.264
SOUND	.227	-.026	1.000	.029	.032	.244	.153
	45	45	45	45	45	45	45
	.067	.433		.425	.417	.053	.158
PICTURE	.134	-.225	.029	1.000	.928	-.517	-.465
	45	45	45	45	45	45	45
	.191	.068	.425		.000	.000	.001
SNDPICT	.031	-.094	.032	.928	1.000	-.566	-.451
	45	45	45	45	45	45	45
	.420	.270	.417	.000		.000	.001
SPELLING	-.006	.122	.244	-.517	-.566	1.000	.926
	45	45	45	45	45	45	45
	.485	.212	.053	.000	.000		.000
SNDSPELL	-.158	.097	.153	-.465	-.451	.926	1.000
	45	45	45	45	45	45	45
	.151	.264	.158	.001	.001	.000	
SNDCOL	-.189	.357	-.173	-.361	-.293	-.252	-.266
	45	45	45	45	45	45	45
	.107	.354	.129	.007	.027	.048	.039
SNDSND	-.254	.065	-.161	-.409	-.326	-.225	-.225
	45	45	45	45	45	45	45
	.046	.335	.147	.003	.014	.063	.068
FEELING	.042	.361	-.164	-.191	-.114	-.359	-.324
	45	45	45	45	45	45	45
	.393	.345	.141	.105	.228	.036	.319
SNDFEEL	.035	-.347	-.206	-.231	-.128	-.327	-.256
	45	45	45	45	45	45	45
	.410	.390	.087	.094	.200	.014	.045

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MUSAPT	.366	-.080	.557	.106	.197	.173	.099
	45	45	45	45	45	45	45
	.007	.300	.000	.244	.262	.128	.262
SPEAKTST	-.028	-.017	-.002	-.135	-.198	.278	.209
	45	45	45	45	45	45	45
	.428	.456	.494	.112	.097	.032	.084
SECRATE	.507	-.159	.271	-.251	-.196	.137	.084
	20	20	20	20	20	20	20
	.011	.253	.124	.143	.203	.215	.362

	SNDCOL	SNDSND	FEELING	SNDFEEL	MUSAPT	SPEAKTST	SECRATE
AGE	-.159	-.104	-.094	-.066	-.278	-.014	-.534
	45	45	45	45	45	45	20
	.149	.248	.270	.334	.036	.463	.012
SEX	-.079	-.073	-.093	-.127	.172	-.103	.038
	45	45	45	45	45	45	20
	.302	.305	.271	.202	.130	.249	.437
GERMAN	.113	.144	-.409	-.334	.415	-.137	-.107
	45	45	45	45	45	45	20
	.229	.174	.003	.012	.002	.185	.327
GPA	.116	-.007	-.365	-.307	.348	-.005	.205
	45	45	45	45	45	45	20
	.459	.482	.005	.020	.010	.486	.193
SPEAK	.031	.039	-.122	-.059	.332	-.106	-.025
	45	45	45	45	45	45	20
	.421	.403	.211	.352	.013	.244	.458
LEARN	.001	-.029	-.166	-.123	.316	-.029	.195
	45	45	45	45	45	45	20
	.497	.424	.139	.211	.017	.425	.205
PLAY	-.265	-.324	.059	.068	.292	-.044	.383
	45	45	45	45	45	45	20
	.039	.015	.327	.329	.026	.386	.049
TAKE	-.139	-.254	.042	.035	.366	-.029	.507
	45	45	45	45	45	45	20
	.107	.046	.393	.410	.007	.423	.011
PLAYSING	.057	.065	.061	-.043	-.030	-.017	-.158
	45	45	45	45	45	45	20
	.354	.335	.345	.390	.300	.456	.253
SOUND	-.173	-.162	-.164	-.226	.557	-.102	.271
	45	45	45	45	45	45	20
	.129	.147	.141	.067	.000	.494	.124
PICTURE	-.361	-.409	-.191	-.280	.196	-.135	-.251

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	45	45	45	45	45	45	20
	.007	.003	.105	.094	.244	.112	.143
BNDPICT	-.290	-.326	-.114	-.128	.097	-.198	-.196
	45	45	45	45	45	45	20
	.027	.014	.228	.200	.262	.097	.203
SPELLING	-.252	-.225	-.369	-.327	.173	.278	.187
	45	45	45	45	45	45	20
	.048	.068	.006	.014	.128	.032	.215
BNDSPELL	-.266	-.225	-.324	-.256	.098	.209	.084
	45	45	45	45	45	45	20
	.039	.068	.015	.045	.262	.084	.362
SNDCOL	1.000	.964	-.297	-.286	-.086	-.093	-.146
	45	45	45	45	45	45	20
		.000	.023	.028	.286	.272	.270
BNDSND	.964	1.000	-.225	-.212	-.092	-.084	-.199
	45	45	45	45	45	45	20
	.000		.069	.081	.274	.293	.200
FEELING	-.297	-.225	1.000	.958	-.258	-.128	.142
	45	45	45	45	45	45	20
	.028	.069		.000	.044	.427	.275
BNDFEEL	-.286	-.212	.958	1.000	-.238	-.026	.194
	45	45	45	45	45	45	20
	.028	.081	.000		.057	.432	.203
MUSAPT	-.086	-.092	-.258	-.238	1.000	-.055	.302
	45	45	45	45	45	45	20
	.286	.274	.044	.057		.360	.094
SPEAKTST	-.093	-.084	-.028	-.026	-.055	1.000	.834
	45	45	45	45	45	45	20
	.272	.293	.427	.432	.360		.000
SECRATE	-.146	-.199	.142	.196	.302	.834	1.000
	20	20	20	20	20	20	20
	.270	.200	.275	.203	.099	.000	

Interrater Reliabilities

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APPENDIX E

PERMISSIONS AND CORRESPONDENCE

200-5th St. SE, #203
Minneapolis, MN 55414
26 March 1984

Mr. Clyde Thogmartin
Department of Foreign Languages
and Literatures
Iowa State University
Ames, Iowa 50011

Dear Sir:

My name is Lisa Fish and I am a graduate student at the University of Minnesota. I am working on an M.A. in Education: Second Languages and Cultures. In my study, I will be investigating the relationships among learning styles, pitch discrimination, sound discrimination, and pronunciation of German phonemes among eighth-grade language learners. I found your study, published in IRAL, Vol. XX/1, February 1982, very helpful.

To collect my data, I will be administering the Gordon Musical Aptitude Profile-Melodic Variations subtest, the MLA Cooperative Foreign Language Test, German Form LA-Speaking Test, the Pimsleur Language Aptitude Battery-Sound Discrimination subtest, and the Reinert Edmonds Learning Style Identification Exercise.

If you are aware of any studies which have been conducted concerning similar variables, I would be interested in hearing about them. I would also be interested in obtaining a copy of Roland Raim's Master's thesis done at the University of Iowa in 1965. I am aware that his thesis is probably located in Iowa City, but if you are familiar with it at all I would appreciate any information. The thesis is titled: "A Comparison of the MAP and the Seashore Measures of Musical Talents."

Thank you for your time.

Sincerely,

Lisa M. Fish

Lisa Fish

Iowa State University of Science and Technology Ames, Iowa 50011

April 2, 1984

Ms. Lisa M. Fish
200 5th Avenue SE, no. 203
Minneapolis, MN 55414

Dear Ms. Fish:

Here are two bibliographies which I hope will help you. Mine is no longer current, since I have not updated it since 1976, but it may contain some studies you are unaware of. Roberta Vann of the English department here is also doing some work on learning styles. She gave me her bibliograpy, which I send along.

Best of luck on your research,

Clyde Thogmartin
French and Linguistics

200-5th St. SE, #203
Minneapolis, MN 55414

26 March 1984

Mr. Harry Reinert
Edmonds School District No. 15
Lynnwood, Washington 98036

Dear Mr. Reinert,

My name is Lisa Fish and I am a graduate student at the University of Minnesota. I am currently working on an M.A. in Education: Second Languages and Cultures. To fulfill the requirements I will be doing a study in a junior high school concerning relationships among eighth - grade German students' learning styles, pitch discrimination, sound discrimination, and pronunciation of German phonemes. In conducting this study I am hoping to use your Edmonds Learning Style Identification Exercise to identify student learning styles. My adviser, Helen Jorstad, recommended "ELSIE" to me and suggested I write to you for permission to use it. I have a copy of the instructions and the fifty words from an article published in the Modern Language Journal, April 1976.

I am specifically interested in the relationships between cognitive style and musical pitch discrimination, and the relationships between aural and visual learners' abilities to perceive and produce sounds in German.

If you have any suggestions or advise I would be pleased to hear them.

Thank you for your time.

Sincerely,

Lisa M. Fish

Lisa Fish

EDMONDS HIGH SCHOOL

7600 212th S. W., EDMONDS, WASHINGTON 98020 771-4364

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Jerry E. Crabb
Administrative Assistant

April 5, 1984

Ms. Lisa Fish
200 - 5th Street SE, #203
Minneapolis, MN 55414

Dear Ms. Fish:

Thank you very much for your inquiry and for your interest in my learning styles exercise.

I am enclosing a copy of my article, "One Picture is Worth a Thousand Words? Not Necessarily!" In the article you will find background information on the development of the exercise as well as the text itself printed in full. I am enclosing a copy of the response/profile sheet I use, in case you might wish to duplicate it for your own use.

I would be pleased if you should wish to make use of ELSIE in your school. If you decide to give the exercise a trial, I would very much appreciate receiving your comments and observations concerning your results.

If I can be of any further service, please let me know.

Sincerely yours,

Harry Reinert

P.S. Grüße an Helen Jorstad! Please let me know how your study proceeds. You might be interested in an unpublished Ph. D. thesis by Phyllis Messer, Univ. of Wyoming, 1979, in which she did a study of ELSIE in relation to 10- to 14-year olds. As far as I know, she is still on the staff there and has done other work in this area since completing her thesis. If you have particular questions, please let me know.